Modelling Residential Tenants' Choices with a Grave as a Negative Externality

This dissertation is submitted in fulfilment of the requirement for the degree of

Doctor of Philosophy

By

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ABSTRACT

Economic theory considers every household as a rational being operating by the principles of bounded rationality to make a home choice with optimum utility in the residential market. This study investigates the impact of the negative externality of a grave on tenants' residential choice. Using Stated Preference method, the study examines three inter-twined problems of residential choice, willingness to pay and market regulatory mechanism. First, is the question on whether the location of a grave within a home affects tenants' residential choice and social welfare? It hypothesized that there is no significant relationship between income, education, family size and accessibility on the choice of home with grave. Second, is the question on economic value of a grave on a residential property's rent? Third, is the question on the efficiency of the Environmental Health law regulating the residential market? Fourth, is the question on the adequacy of neoclassical economics solution to the negative externality of a grave on residential property.

The research methodology is dominantly quantitative. In particular, it applies choice modelling in an experimental study agenda to explore the effect of a residential property with a grave on tenants' residential choice and rent. It also examines tenants' sensitivity to a rent discount on a home with a grave in different parts namely, frontage, side, backyard and room. The context is the Private Renter Sector within the informal residential market in Akure, a State capital city in Southwestern Nigeria. To achieve these raison d'êtres, respondents are presented with discrete residential choices developed by Sawtooth software in a stochastic process. The choice context requires some moment of trade-off to reach a stated choice decision, which reveals tenants' WTP. Data analysis involves the use of basic probabilistic models; namely ordinary least square (OLS) and multinomial logit model (MNL). It progresses to the application of a Hierarchical Bayes (HB) model for a more robust and reliable parameter estimates

The study reveals that most of the respondents prefer a choice of un-impacted property. The fixed choice model estimates shows that the majority of them would protect their social welfare by WTP 10 percent above the open market value of a property without a grave. Parameter estimates show that preference varies with respect to different locations of a grave within a residential property. Tenants most

prefer a property with a grave at the backyard; this is followed by a preference for a home with a grave at the side, frontage and in a room respectively. The model's distribution of WTP estimates shows that a residential property with a grave would lose between 15 and 20 percent in rental. Sensitivity analysis shows that tenants' responsiveness to a high rent discount on residential property with a grave is inelastic; thus exposing the limitation of a neoclassical economics approach to welfare issues. Parameter estimates on attributes importance and contribution to the residential choice decision show that rent, accessibility and other variables all pale into insignificance in the face of the grave factor. The property market regulatory mechanism exemplified by the Environmental Health Law shows ambivalence and lack of definiteness in its exception to the rule.

In conclusion, the study noted that the negative externality of a grave on residential property emerges from the violation of property right and partly the law. It problematizes the law and its' implementation as crucial to tenants' residential choice, rental value and welfare. Consequently, it argues for remedies from both legal perspective and market process; and advances a course for reappraisal of the Burial on Private on Premises Law. Ultimately, it argues for a welfare approach as exemplified in planning values to strike a healthy balance between land use for graves, residential choice, rental and social welfare.

DEDICATION

This thesis is dedicated to the almighty God, the giver of all good things.

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DECLARATION STATEMENT

ACADEMIC REGISTRY
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Acronyms

ACBC- Adaptive Choice Based Conjoint

ACA- Adaptive Conjoint Analysis

CAFO- Confined Animal Feeding Operation

CAPI- Computer Assisted Personal Interview

CBC- Choice Based Conjoint

CE- Choice Experiment

CV- Contingent Valuation

CM- Choice Modelling

CVA- Full Profile Conjoint Analysis

GRA- Government Residential Area

HB- Hierarchical Bayes

HP- Hedonic Pricing

IIA- Independent Irrelevant Alternative

LUST- Leaking Underground Storage Tank

MNL- Multinomial Logit Model

PRS- Private Rental Sector

RLH- Root Likelihood

RP- Revealed Preference

SP- Stated Preference

WTA- Willingness to Accept

WTP- Willingness to Pay

Definition of Terms

Main effect- the effect of one level while ignoring the level of other factor

Interaction effect- The influence of one level on another (the difference of difference)

Zero centre part-worth- A code for measuring the attributes' performance where all utilities/effects within each attribute's levels sum up to zero

Chapter 1
Study Background

1.1 Introduction

Residential property occupies a prime position at the centre of man's socio-economic life; this earns it a global prominent role in the scheme of human affair. Global attention to this exemplifies various attempts to ameliorate the qualitative and quantitative issues surrounding its provision by governmental and non-governmental organization. The establishment of UN Habitat and its' provision of technical and normative assistance on housing development, the World Economic Forum "Housing for All" agenda and the International Human Rights proclamation of housing as an inherent right of every man exemplify the priority of residential property. These organisations and many other scholarly publications establish a nexus between residential property and health, micro and macro-economic development. Despite all the attempts to increase the access to residential property, a huge number of the households are not able to own their own housing due to the huge capital commitment. However, the market offers a limited range of options apart from outright ownership such as lease, mortgage, rent to purchase to households. Irrespective of the option chosen by any household, Quigley and Raphael (2004) noted that housing has the largest portion of the item of expenditure in the budget of most households. For a middle-income household who chooses the lease option, housing occupies one quarter of their expenditure while a half of the poor or near-poor households income goes to housing expenditure.

Regardless of the socio-economic status, every tenant aspires to reside in a residence that optimizes social welfare. Despite the aspiration, property rights can constrain the utility gained from their residential homes. With particular reference to the lease option, tenants' de-jure property rights to a healthy residential environment may be thwarted if other market regulatory mechanisms fail. In other to ameliorate the challenges associated with the lease option and others tenure, there is a global advocacy for home ownership in every nation. Andrew and Sanchez (2011) observed that even if the broader net effects are unclear, public policy in many OECD Nations is geared towards enhancing home ownership through preferential tax treatment of

housing investment and alleviated credit constraint of the financial market. Similar course of action noticed for home ownership promotion in the developed world are also visible in the developing nations. However, affordability and other personal reasons force many people to take up the lease option. Consequently, the renter market remains an important part of the residential property market. A leaseholder possesses limited rights and the achievement of his social welfare is subject to the superior property rights of the landlord. This often happens when a landlord abuses his property right to create negative externality effect on the tenant. From a remarkable intellectual convergence, several studies such as Marshall (1885), Piguo (1920) and Coase (1937) argue that negative externality is a product of market failure. Evidently, many of the previous and recent publications on negative externality in Nigeria residential property focus on three notable directions.

The First group include but not limited to the works of Ebong (1983), Wahab et al (1990), Muoghalu (1991), Olayiwola et al. (2006), Jiboye (2009), Ibem & Amole (2011), Amao (2012), Amao & Ilesanmi (2013) and others. These studies largely conceptualise negative externality on structural conditions to examine housing quality. Building upon the aftermath effect of the qualitative problem of housing, many studies have established a link between poor residential quality and health concerns, wellbeing and quality of life. This is evident in the studies carried out by Wilkinson (1999), Shaw (2004), Commission on Social Determinants of Health (2008), Scottish Government (2008) Gibson (2011) and Bowie (2013). For instance, motivated by the health concern of living in poor quality apartment, Gibson et al. (2011) provide an insight into the understanding of the psychosocial impacts of the housing type. Similarly, Petticrew et al. (2009) report a significant improvement in the health and well-being of households that moved home within a year from housing affected by noise externality and dampness in Scotland. The excerpt below described improvement in well being in one of the respondents.

Well, I've not been admitted to the hospital since I've come round here, I'm. alot healthier than what I used to be. As I say, I've got more freedom of movement because I'm getting into fresh air a lot more, which is probably helping as well (Petticrew, 2011).

The second group of studies build on the problem of poor housing quality to measure households' satisfaction. Empirical studies in this regard are evident in the works of Ogu (2002), Oladapo (2006), Ilesanmi (2012), Ibem & Aduwo (2013) and others. The third group of literature are quite analytical, they examine and quantify the effect of specific environmental and structural condition that affect residential choice and WTP on impacted property (see chapter four for details).

Noticeably, most of the researches carried out in this regard in Nigeria provide an insight to possible cases of negative externality in the Nigeria property market. However, many of them are based on observational study with rhetoric in literature on housing quality and the cluttering of disparate issues in the residential property market. Therefore the need to examine the fundamental disparate issues, analyse their influence on property value and choice is essential. Negative externality manifests in a large number of ways, most of the studies that examine their impact on residential property value generally show a loss but with varying significance. Firstly, in certain cases, findings from some studies reveal persistence loss in value and perceived unattractiveness of impacted property even after post remediation clean up. Extending this argument, empirical studies carried out by Dale et al, (1994), Hurd (2002), McCluskey and Rausser (2003), and Man & Wong (2012) show that both temporary and long term stigma are possible equilibrium outcomes after the discovery and cleanup of an impacted site in Dallas, Los-Angeles, HongKong and Houston.

Secondly, in a few cases, there are differing opinion on households' perception on negative externality and its impact on property value. Boyle and Kiel (2001) carried out a meta-analysis on the impact of negative externality of air pollution and water quality on property value. Findings reveal that air externality generate mixed result with the assumption that homeowners are not aware of the factors of interest. On the other hand, the impact of water pollution shows consistent loss in residential property' value. In a study of the impact of High-voltage transmission lines (HVTL) by Pitts and Jackson (2007), no significant effect was recorded of its' impact on nearby residential property value. The literatures cited above analyse actual sales data collected from homeowners that presumably bought a residential property without any awareness of a negative externality. This provides an insight on the need to carry out a study with a context specific negative externality where households

have sufficient information on the variable of interest that might affect their choice and willingness to pay (WTP). The study achieved this by applying stated preference method, a globally growing but rare research method in Nigeria to model the externality that might affect residential choice and WTP. In the light of this, the research investigates tenants' perception to location of a grave as a negative externality and attempt to model tenants' using stated choice technique. It further examines the policy implication of such practices in an informal property market where this phenomenon is ubiquitous and continually spreading.

1.2 Statement of the Problem

The growing numbers of graves on residential properties in many urban areas poses a great challenge to the future of many Nigerian cities. The characters of most Nigerian streets are changing, it is now common to find many slogans like; *Rest in Peace* (R.I.P), *Adieu Papa, the Soul of the Faithful Rest Here* and others boldly written on residential properties. Similarly, after burial services, a statement like, interment follows immediately at the deceased residence is common. Every human activity produces waste, often with a negative effect. As a mortal being, man himself becomes a waste needing safe disposal when he passes away. Guttman et al. (2012) noted that the disposal of cadaver is a challenge societies have struggled with from time immemorial. Attempts to overcome this challenge are demonstrated in the location of cemeteries in specific areas for burial purpose. According to Guttmann et al. (2012), historic concerns of the negative externality of cemeteries have occurred worldwide over many countries.

In the ancient times, the Romans and Jews believed that cemeteries are unsanitary and hazardous; hence, they are located outside the cities (Engelbrecht 1998). Engelbrecht noted that the location of cemeteries within residential areas creates hygiene problems. Arguing from similar contextual stance, the English General Board of Health Report reveals that groundwater pollution from cemeteries is one of the main causes of cholera in the early 1800s (Bachelor, 2004). In Nigeria, Medical experts discovered that the recent outbreak of Lassa fever epidemic in Ose and other urban centres is traceable to the location of graves within residential properties. The chief vector of this disease ‘Rat’ burrows into graves of infected corpses to feed on

them and later spread the disease by feeding on domestic foodstuffs (Ondo State Radio Corporation, Broadcast 2009).

One of the health hazards of the location of a cemetery within residential properties recorded in a study carried out in the United States by Spongberg & Becks (2000) and Guttman (2012) shows that graves contain harmful chemical compounds. The chemical arises from the decomposition of corpses and funeral artefacts released to the surrounding groundwater. The threat of this danger becomes a major source of concern in an economy where the majority of the households depend on ground water supply. Typically, shallow wells are the main source of domestic water for most households. Only 1.82 percent of the households in Akure have access to pipe borne water from the public mains (NPC 2008). Consequently, over 98 percent of the residents are susceptible to health risk and loss of social welfare. Similar study carried out by Larsen & Coleman (2010) in Ohio buttresses the previous finding by reporting that residential properties located close to a graveyard are psychologically impacted with health risk to nearby underground water. They stressed that such properties are rarely high-end properties and take a longer time to find a would-be renter or purchaser.

As the rising wave of the location of graves within residential properties increases in many Nigerian cities, it is apparent that the ultimate aim of holding an interest in property is not optimally realised. This is contrary to the overall aim and concept of the possessing either leasehold or freehold interest in property as defined by Thorncroft (1976). In view of the perceived problems of the location of a grave' within residential properties, there is a threat to tenants' choices, rental value, utility as well as the residential market. This phenomenon obviously culminates into a case of externality. The study carried out by Marshal (1886) and expanded by Pigou and Coase in the early part of the 20th century, drew the first global attention to a negative externality. The empirical focus of their studies of externality was mainly concerned with the negative externality, which is caused by industrial activities on nearby properties. The authors largely argue for the recognition of property's right to ensure internalisation of social cost of a negative externality by the polluter. Attempts to do this culminate in land cadastre and various land policies guiding the use of land and landed property. With these measures in place, the authors argue that the property market will be efficient in its outcome. Marked evidence of reduction in

negative externality caused by landlords action and violation of property rights are visible in the UK, US, Australia and other developed world cities that uphold these measures. However, negative externalities occasioned by natural circumstances and other lawful activities within the residential environment remain potential threats to human welfare and property value.

Despite the establishment of measures that recognize property rights, literature rehearses that the Nigeria property market is largely informal and without well-defined property rights. Evidence from observation of the study area shows indiscriminate location of grave within residential properties.

1.3 Research Questions and Hypotheses

Stemming from the statement of research problems, the externality of a grave located within residential properties may affect tenants' choices and WTP. As the world steps up action on zero risk to the disposal of hazardous waste, the current use of residential property for grave creates a doubt on the efficiency of the property market and its regulatory framework with specific reference to delivering socially satisfying homes to tenants. The location of a grave in a home has become a commonplace and a tradition in the Private renter sector (PRS) in Akure. Against this backdrop, the study seeks to answer four intriguing research questions.

- What is the impact of a grave on tenants' residential choice?

  All things being equal, a residential property will let at its' full rental value in the open market but this is doubtful with the location of a grave on it. This leads to the second and third question stated below.

- What is the possible loss in the rent of a residential property with a grave?

- How acceptable is the neoclassical economics solution to the negative externality of a grave on a residential property?

- How effective is the Burial on Private Premises Law?

  In order to answer the questions asked by this study, four null hypotheses are set and tested. They are as listed below:

H_{01}: Suitability of a location for daily activities has no significant relationship with the willingness to rent a residential property with a grave

H_{02}: Income has no significant relationship with the desire to continue occupation of a residential property with grave.

H_{03}: Education has no significant influence on the possibility of renting a residential property with a grave.

H_{04}: Family size has no significant influence on the willingness to continue tenancy in a residential property with a grave.

1.4 Aim and Objectives

The aim of this research is to develop a choice model that offers an empirical and theoretical understanding of the externality of a grave in the residential market. Within this broad aspiration, it investigates three interrelated problems of choice, willingness to pay (WTP) and a market regulatory mechanism. In order to achieve this aim, the study set out the following objectives:

i. Examine tenants' choices among a discrete set of residential alternatives with a grave and without it
ii. Examine tenants' WTP for a residential property with a grave.
iii. Examine the importance of a grave to a tenant's residential choice decision.
iv. Examine the sensitivity of respondents to rent discount in a residential property with a grave.
v. Examine the legal implications of the location of a grave on a residential property.

1.5 Justification for the Study

Conflicting land uses produce negative externalities that affect utility, property market, value, urban scenery and the character of residential environment. Previous studies by Igwe (1987), Molen (1999), Mabogunje (2000), Omirin (2003), Fatokun (2003), Moyo (2004), Kingswill (2005) and Ayala et al. (2005) have extensively dealt with issues in land accessibility and administration. Falade (2000), Oseni (2001), Abumere (2001) and Ukwu (2001) in related studies worked on illegal development on land where no ownership rights exist in Abuja. Moyo (2005) noted

that the increasing focus on land use options reflect failure of development. Specifically, these studies concentrated on accessibility to land. Balchin (1995) and Adegoke (2005) worked on the negative externalities accruing to an individual, group or firm due to the consumption or production activity of another individual, group or firm without compensation.

In a study carried out on urban landscape in Nigerian cities, Adeagbo (2000) noted that urban landscape in Nigeria is characterised by incompatibility and non-compliance with planning regulation. Though compatibility of land uses in developed world is highly settled, in Nigeria incompatibility of land uses permeates the cities with overwhelming negative externalities on urban dwellers. Asabere et al. (1999) stated that zoning codes enhance real estate owners' enjoyment of their properties by limiting the location of activities with potential negative externalities. Their findings on the price impact of incompatible land uses in Philadelphia reveal that housing in areas prone to negative externalities sold for 16% less than the price they would have commanded in the interiors of residential areas devoid of negative externalities.

In a related study, Bello (2005) examined the impact of the externalities of waste dumpsites on rental values of properties across three neighbourhoods in Lagos. None of the authors cited in the various studies explored the negative externalities caused by landlords' use of property rights for graves. Similarly, a recent review of literature (See chapter five) shows that research efforts directed towards modelling household choice in an impacted property market is lacking. As Bateman (2002) rightly pointed out, if the economic value of a "bad" is not appraised, it will lead to over production of such bad in the market. With a gross neglect of the appraisal of loss in economic value of properties due to location of graves on residential properties, the need to embark on this research work is essential. In view of these gaps and the urgent need to salvage the threatened urban centre from decay, a research effort in this direction is justified. The research takes a departure from the existing works that report on widespread informality in the Nigerian property market to cover the knowledge gap.

1.6 Methodology

The methodology applied in this research fall within the ambit of a broad research method known as Stated Preference (SP). The study applies one of the best SP methods known as choice modelling with particular reference to stated choice experiment. The preference for this method over other conventional SP approaches such as contingent valuation, rating and ranking is based on its consistency with the theory of consumer economics. The stated choice experiment method involves a design of choice scenarios that mimic what the respondents are actually experiencing in the residential market. The choice set scenarios are designed using Choice Based Conjoint (CBC) facilitated by Sawtooth software. Emanating from the design are twelve choice tasks depicting a number of residential properties with unique characteristics.

The choice tasks are presented to the respondents through questionnaire administration, to elicit information on their preferred choices if faced with such housing options in reality. For consistency with the consumer theory, bounded rationality and open market reality, each task contains four options including a status-quo option. With this, tenants' make their residential choices decisions without undue influence and duress. The quantitative choice data collected are analysed using econometric models namely, Multinomial logit model and Hierarchical Bayes model. With the pragmatic philosophical approach to this research, descriptive data are collected and analysed using non-parametric analytical statistics. The data facilitate the test of hypotheses surrounding the research questions and triangulation.

1.7 Novelty and Contribution of Research to Knowledge

This research provides a unique contribution to knowledge. Study on negative externality is widely represented in literature, but most of the works are from the occidental. Similarly, most of the studies are largely inspired by natural occurrences and lawful activities that generate negative externalities, which affect property's value. In developing countries, although much have been discussed in literature on wide spread informality of residential property development, only a few research efforts have been made to examine the impact of negative externality on households' choice and property value. Most of the studies relied on historic evidence of value

and applied revealed preference methods. To date, despite the large volume of literature on negative externality in Europe and America, none of the studies investigates the influence of a grave on tenants' residential choices and rental value. The closest studies to this research focus on the impact of cemeteries on nearby residential properties' values in Ohio. Similarly, a review of informal publications and social discourse on Nigerian social media provides a bit of people's attitude on the location of a grave within residential property. This research is a land breaking quantitative attempt at modelling the impact of a grave on tenants' residential choices and WTP. It provides an avenue through which useful information that emanates from the discourse review and broader agenda of this research can enter into formal publications.

Regarding the method applied, the research adopts a methodological approach "known as choice experiment" in its fact-finding mission. This method has been widely applied in the developed world with proven reliability of result, however, to date, there is no record of the application of such approach in any of published materials in Nigeria. This research therefore provides an insight to a growing methodological approach suitable for choice modelling and economic valuation of non-market good. This offers a good replacement for hedonic pricing HP model and contingent valuation CV, which is popular in Nigeria but with reliability problem. Considering the taxonomy of the observed respondents' sensitivity to the location of a grave in different parts of a residential property, the study contributes to the existing body of knowledge by disapproving neoclassical economic solution to negative externality affecting households' welfare. Consequently, it consolidates the initial findings from few studies such as Walker (2002) that most households prefer a socially acceptable residential property than financial compensation for property with some form of negative externality as advised by neoclassical theory.

Fundamentally, the research also makes useful contribution to the on-going debate on land reform and the need for a clearly defined property rights for market efficiency. It highlights issues that are of significance to policy and tenants' social welfare. For instance, it contributes to the fact that a society that is market driven in the allocation of property rights cannot protect the social welfare of tenants (vulnerable group) and the society.

1.8 Scope of the Study

The study attempts to model the impact of residential properties with graves on tenants' residential choices in the private renter sector. The study focuses on the informal residential property market where the menace of properties with graves is ubiquitous and continually spreading. The geographical coverage is restricted to Akure, a State capital and the most populous urban centre in Ondo State, Nigeria. Other types of developed and undeveloped properties such as commercial property and undeveloped residential land are also with graves but are not included in the study context. Similarly, wider issues concerning the possible health effects of residential property with a grave are beyond the scope of this study.

1.9 Summary of Findings and Recommendation

- Findings from the models estimates show a consistent tenants' preference for a residential property without a grave. However, the effects of a grave on tenants' residential choices show that 67 percent will move homes against wilful choices if graves were suddenly located in their current homes. The tenants with low-incomes are worst hit by the effect of a grave in a house. Findings show that 43.9 percent of them are constrain to live in a residential property with a grave, while 26.5 percent would sacrifice their social welfare for the unexpired term of their tenancies and move home as soon as they expire.
- Estimated WTP on current market realities, estimates show that a residential property with a grave would lose between 15 and 20 percent in the open market rent. Estimates show that the possibility of a 20 percent loss in rent on home with a grave is higher. This shows that there is a significant loss in rent of a residential property with a grave.
- Findings show that the grave factor is the most important variable affecting tenants' residential choice decision (see table 10.14 in chapter 10). The no grave variable level plays a significant role to accord it this status on the attributes importance profile. A location with accessibility advantage to work and local services has a relatively low significant impact on tenants' residential choices. This finding strengthens the robustness of the previous

studies that tend to de-emphasize accessibility as the most important attribute affecting households' residential property choices.

- Regarding sensitivities to rent discount, findings show that there is no direct relationship between reduced rent and demand for a residential property with a grave. The findings disapprove the neoclassical economics solution to a negative externality in the residential property market
- Findings show that the Burial on Private Premises' law prohibits the location of a grave on a residence. However, the ambivalence and lack of definiteness in the law renders it somewhat hypothetical by paving the way for voluntary compliance and discriminatory enforcement.

The study recommends a strong case for tenants' right campaign and a re-engineering of the land administration system, which defines the rights, responsibility and restriction on residential land use in Akure.

1.10 Structure of the Thesis

This thesis contains ten context specific chapters as shown in table 1.1. Chapter one discusses the introduction to the research. It provides explanations on the statement of the research problem, aim and objectives. Chapter two presents a review of land administration, which is fundamental to the nature and success of residential property market in Nigeria. Chapter three examines the Nigerian property market and its efficiency. Chapter four presents a review on the concept of negative externality and examines both neoclassical economic and social welfare approach to it. Chapter five presents a review of some empirical studies that investigate the influence of negative externality on residential choice and value from both RP and SP perspective. It discusses the conceptual framework for the study and model specification. Chapter six presents a discussion on the broad concept of the research methodology and narrows down to the specific SP method applied for the experimental design. Chapter seven presents a discussion on the analysis of descriptive data while chapter eight dwells on the presentation and analysis of the stated choice data. Chapter nine presents a synthesis of discussions that address the findings on the research objectives. The final chapter presents summary of findings

that directly engage the research questions. It discusses the policy implications of the research findings and recommendations.

Table 1.1: Research Agenda

Themes		Chapters	
1	Study's Background	1	Study's Background
2	Literature review	2	Land administration and management
		3	The Nigerian Property Market situation
		4	Negative externality
		5	Application of RP and SP approaches to Impacted residential property
3	Research Methodology	6	Methodology
4	Analysis	7	Analysis and presentation of descriptive analysis of non-parametric data
		8	Analysis and presentation of stated choice data
5	Discussion of findings	9	Discussion of parameter estimates
		10	Summary of findings and policy implication

Chapter 2
Land Administration and Management

2.1 Introduction

This chapter recognises the fragility of land as life dependent factor and sets out to achieve two specific objectives. First, it seeks to examine the key role of land administration in the determination of the property market's outcomes. Second, it examines land management and Policy that are necessary to achieve the essential function of land administration. The chapter is organised into seven sections. Section 2.2 discusses the concept land of administration as well as issues that surrounding it. Section 2.3 addresses the concept of land tenure in Nigeria, which opens up a debate for land use and development problems in section 2.4. Section 2.5 presents a discussion on land management that paves the way for further discussion on the Land policy and planning laws in section 2.6. Section 2.7 provides a conclusion to the chapter.

2.2 Concept of Land Administration

Land administration is a subject with universal concern, which attracts large volume of scholarly contributions from researchers. It cuts across land allocation, tenure, management and control within a framework of fairness and sustainable development. According to UN-ECE (1996), land administration is the process of recording and disseminating information about the ownership, value, use of land and its associated resources. It includes determination of rights and other attributes of the land, survey description of rights, and their details documentations as vital source of information for the land market. The contributions of Williamson et al. (2010) provide an insight to the understanding of the concept through various questions that facilitate easy grasp. They asked:

> *imagine that the use and development of land is not controlled through overall planning policies and regulations; imagine that tenure to land and property cannot be secured and imagine a slum area of 250 hectares with*

more that 1 million inhabitants lacking the most basic occupation rights and without basic water and sanitary services?'

The questions show that land administration is concerned with addressing problems, by providing a basic infrastructure for implementing land related policies and land management strategies to ensure social equity, economic growth and environmental protection. It is a holistic system comprising subsystems, which actualizes strategies to implement land policy with regard to ownership, use, right, privileges and control.

Due to the multicultural nature of every human society, different nations have adopted different land administration systems. However, irrespective of the level of sophistication adopted in different countries and polarisation of the concept by vagary of the multi-cultural society, land administration principle and its functions remain the same (Williamson 2000 and Enemark, 2010). Figure 2.1 shows that the essential functions of land administration are to maintain a healthy balance between tenure, use, development and value.

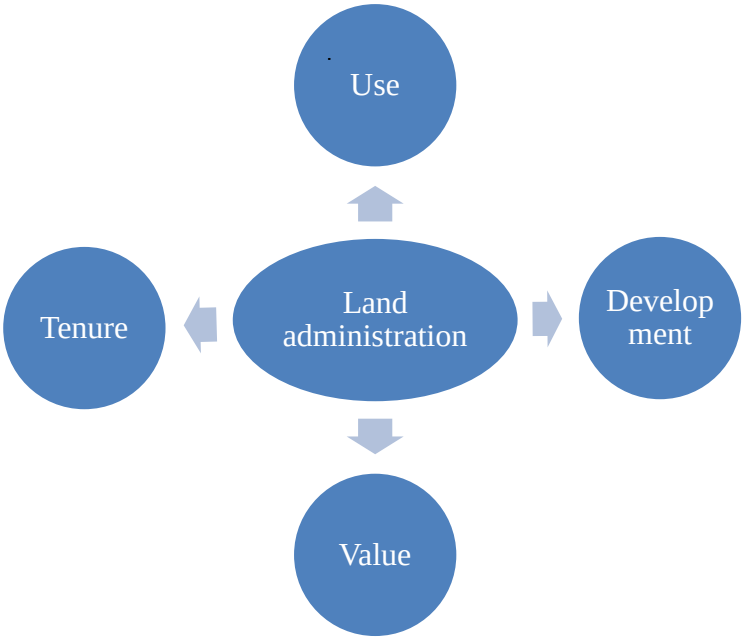


Figure 2.1: Functions of Land Administration

Williamson et al. (2010) took a global contextual view of how land administration can achieve its' functions and came-up with ten land administration principles. With a strong and universal theoretical foundation, the principles administer the way people relate to land irrespective of the state of development of the nation. However, two of the principles specifically "rights, responsibilities and restrictions and

measure of success" are important to the scope of this study (see figure 2.2), others are tangential to it and are superficially treated.

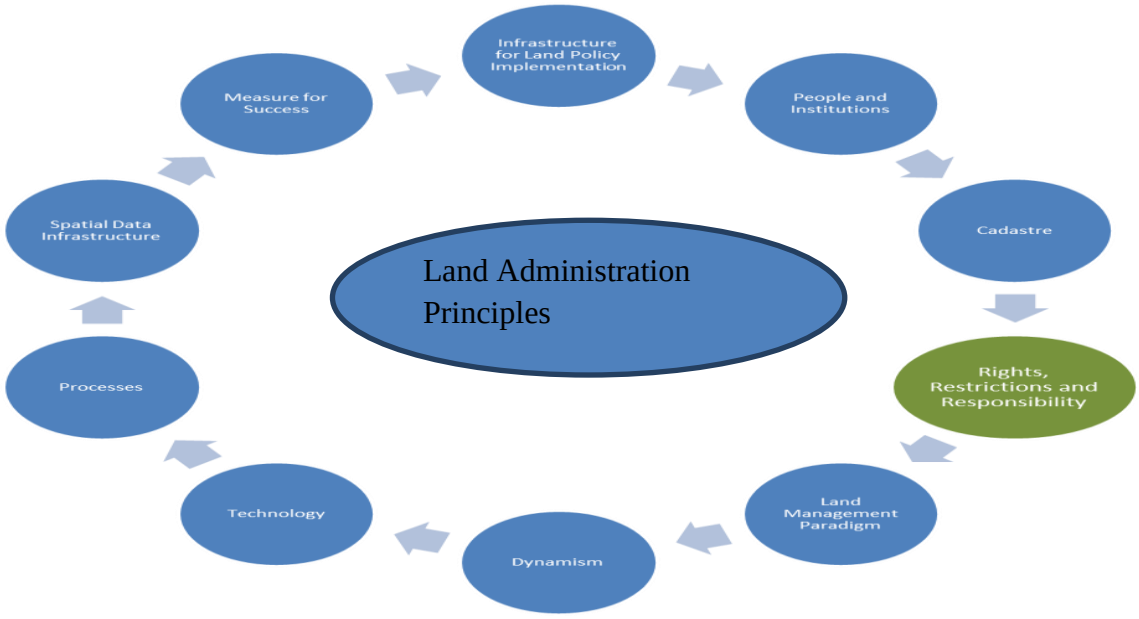


Figure 2.2: Principles of Land Administration
Source: Adapted from Williamson et al. (2010)

2.2.1 Issues and Challenges to Land Administrations

Despite the potential importance of land administration, its' issues are globally enormous and with a direct link with social, economic and political well-being of a nation. This assertion is supported by Deninger, et al.(2011) who noticed that a number of issues have recently led to renew interest in land administration in Africa and other developing countries. These were exemplify in the studies carried out by Durand and Larserve (1996), Pander (1998), Rakodi and Leduka (2004), Nwaka (2005), Butler (2009), Atilola (2010), UN (2010), Butler (2012) and Obayelu (2013). These studies discover that unregulated and informal settlements characterized by conflicting land uses with attendant negative externalities, surround all the cities in densely populated regions of developing countries. Cases of illegal occupation of public and private properties, buildings without formal approval, boycott of building laws (construction statistics, building materials, building height, density and infrastructure) are also rife. In addition, there are residential buildings without official transfer records and registration. UN (2010) declares that 60 percent of many African cities are composed of informal residential properties. Linked to this claim,

are inappropriate land administration, management, inadequate or non-existent urban land policy and poor governance framework and land arrangement. The report acknowledges that the current piecemeal land reform in many of the countries and slum clearance cannot provide permanent solution to issues in land use. Dale (2000) also noted that developing economies are bedevilled with the challenges of complex land administration in both rural and urban areas. He noted that the Bathurst FIG (1999) declaration on the challenges of land administration generated a lot of conferences and workshops in many countries. However, the achievement of this call remains mere rhetoric in the developing nations, as there are no clear practical implementation strategies for the realisation of the declaration (Dale, 2000). Dale observed the enormity of abuse of land use in developing countries and argues that such acts should be seen as crimes.

In the developed world, Schultink (2007) and Jones (2014) observe that recent public survey by academics and practitioners increasingly identify land use conflict and growth management as significant policy concern. Schultink notes that public perception of the soaring demand and desirability for population growth has changed since the Second World War. This is evident in various increasing national strategies to balance the demand for land and urban growth as suggested by communiqués from various conferences. In the United States, the core concern is land use change and specifically conversion of rural open space and prime agricultural land, woodlots and wetland to residential properties. This is characterised by extensive and inefficient land use pattern with some negative externality on the rural dwellers (Schultink, 2007).

Williamson's (2000) study draws from a key number of publications and personal experience to provide an insight to what he considered as the best land use practice in developing nations, using Indonesia as an example. He emphasises the peculiarities of certain variable factors such as, socio-economic factor, culture, law, institution and administrative circumstances, which evolve the uniqueness of each countries and the unique requirements for land administration infrastructures. With this background, Williamson argues that the variable factors suggest that most nations need to develop unique land administration strategies within the context of the operating relationship of humankind to land. This view is consistent with Burns and Dalrymple's (2008) proposition for most countries' land administration. Both

authors argued that land administration may be developed to suit the multicultural society of any nation and as an option to land nationalization, which tends to be popular in the 21st century. However, the principles of rights, restrictions and responsibility as well as measure of success must be unequivocally uniform in all the administration.

2.3 Concept of Land Tenure

Land is an essential life support system central to social and economic development. Human activities are constantly competing for the use of land; hence, the need to guide access as to who owns what, for what purpose and for how long becomes important through clarification of tenure. Land tenure defines the relationship, whether legal or customary among people, individuals or groups with respect to land. It is an institution as well as rules invented in the societies to regulate human behaviour with regard to land (FAO, 2002). According to Adedipe et al. (1997), the evolution of land tenure is a complex and dynamic process, involving the traditional political system, the modern legal system and religion. Land tenure is a complex and crucial aspect of land administration entailing the rules, regulations and process guiding access to the use and ownership of land. The rules define access to land within a community, control and transfer of land, associated responsibilities and restraints.

2.3.1 Historical Brief of Land Tenure System in Nigeria

Mabogunje (2007) noted that when Britain made a colony and protectorate of Nigeria at the beginning of the 20th century there were multiplicity of land tenure systems in Nigeria. However, they all operate by customs in different communities. Meek (1957) stressed that apart from Lagos colony where an English freehold system had been established following its annexation in 1861, the diverse tenures guiding land use in Nigeria can be broadly grouped into two. The first group exemplifies the customary land tenure system that was the dominant tenure law in Southwestern and Southeastern part of the country. The second is the system obtained in Northern Nigeria where the colonial administration placed all lands under its control. Access to land was subject to the Governor's disposition through

the Land and Native Right Proclamation of 1910. The system underwent some changes, which lead to the emergence of the Land Use Act of 1978. The two basic land tenure systems discussed in the next subsections are currently in operation in the study area.

2.3.2 Customary Land Tenure System in Nigeria

According to USAID (2010), customary law is described as local, un-codified, evolving system of principles and norms, which determine access to land use rights. It varies according to the ideology and uniqueness of every community where land is largely regarded as owned by universal deity. Land is considered as a resource owned by a vast family of which many are dead, few are living and countless are still unborn. Pottier (2005) noted that customary law is an established ideological screen of continuity, providing a political space through, which Africans resisted colonial rule via the general principle of non-alienation of interest in land to aliens.

Prior to the nationalization of land via the promulgation of the Land Use Act of 1978, there were variations of land tenure system. Adedipe et al. (1997) observed that the regimes of diversities emerged from a variety of historical and socio-political forces. They observed that some of these have been peculiar to specific regions of the country, leading to Northern, Southeastern and Southwestern variations. Adedipe et al. (1997), Mabogunje (2010) and other scholarly publications noted that other factors like colonial influence and national constitution had only theoretically existed with insignificant impact on the customary land tenure system. Kings, chiefs, and family heads still hold bulk of the land in trust for the people, but with a wide range of regional variation from West to East and from North to South. Evidently, studies on land tenure in all parts of Nigeria were premised on three fundamentals, which include:

- Everybody had direct right of access to land through the king and family head in a clan or community where he/she is considered an Autochthon;
- Recognition is given to usufructuary permanent personal rights on improved land and the right to transfer this through inheritance rule to heirs within a lineage. A grantee could possess the land as long as he used it to his family's

or society's benefit, and could pass the land on to heirs and pledge its use to satisfy a debt, but could not sell or mortgage it; and

- The right of disposal of an interest in land belong to the community, which acting through traditional authorities, exercised this right in accordance with customary law

Adedipe et al. (1997) reported that the customary land tenure is not only still in existence in Nigeria today, but it has become formalized and modified as necessary, being the surest means of accessing land.

2.3.3 Statutory Land Tenure System

Attempts to overcome the multiple customary land tenure system and its concomitant challenges culminated in land nationalisation. This is achieved by the enactment of the Land Use Act, Chapter 202 Laws of the Nigerian Federation in 1978. The Act comprises of eight parts.

Part 1(1) states that subject to the provisions of this

> *Act, all land comprised in the territory of each state in the Federation are hereby vested in the Governor of that state. Such land shall be held in trust and administered for the use and common benefits of all Nigerians in accordance with the provision of this Act.*

The Act seeks to achieve the following fundamental objectives:

- To make land accessible to all Nigerians at any part of the country irrespective of ethnic background
- To eliminate speculations in land purchases
- To eliminate the difficulties often encountered by the Federal government in the acquisition of land for overriding public interest.
- To eliminate drudgery and frequent clashes that often leads to loss of lives and limbs from transaction in land between individuals.

The achievement of the Land Use Act objectives largely remains on paper as it rather hinders the accessibility to land than promoting it. Cotula et al. (2004) buttress this fact that statutory land tenure in Nigeria and most African countries are characterized

by strong, centralized state control over land management and administration. They stressed that inadequacy of the imported legislative models and inability of the state to manage the land resources it acquired is a major drawback. Consequently, the informal decentralized system continues as the main access to land to the local population. This explains the reason for a large number of informality and a phenomenon of two cities in one in most Nigerian cities. Most Families are now selling undeveloped land supposedly acquired following the promulgation of the Act. Although the Act was a good attempt aimed at nationalising land and restructuring the land market, it became the beginning of informal land market as customary law is still in practice today (Adedipe et al. 1997). Inferences from the aftermath effects of the fundamental land law shows an emergent of three distinct land markets. They include, land market for direct state allocation, quasi-informal or pre-1978 land market and the informal land market. However, the informal customary law is still in full force and remains the surest means of gaining access to right of use land; thus explaining the dominance of land and residential property market by the informal sector.

2.4 Land Use and Development Problems

The relevance of land as the base of all human activities is recognized in economic development of urban areas; hence, the imperativeness of its utilization in a coordinated manner as the endless list of human endeavours is on the rise. However, the current land use challenges and development in the 21st century globally reveal an emergence of complexity of rights, restrictions and responsibilities over land, which must be protected. This awakes global consciousness to land use and administration focusing on efficient land administration offering environmental and social benefits as opposed to a more traditional focus on economic benefits especially in developing countries (UNECE, 2005). Wit and Verheye (2007) observed that the continuing degradation and declining limited land resources base commands prioritization of its use and allocation to satisfy needs in the most equitable way. They noted a declining trend of world level per capita usable land dropped from 0.39b ha in 1961 to 0.27 ha in the 1990s. A sharp decline is also observed in the African per capita usable land; record shows it nosedived from 0.62ha in 1965 to mere 0.26ha in 1995. Given the importance of land and the

declining per capital usable land; Aina and Oduwaye (2009) argue that land use in every nation should be predicated on articulation and incorporation of environmental and human needs in pursuit of development objectives. The current situation in most developing economies particularly Africa and Asia shows that land issues remain a perennial problem. This view is evident in the attention it attracted in studies carried out by World Bank (2007) and Deninger (2010). They argue that the recent level of attention generated on land use in Africa should be set to achieve three major objectives. They include; sustainable and productive land use, controlling and keeping pace with soaring demand for land and effective distribution of public goods.

With specific reference to Nigeria, many studies have linked the urban land use problems to rapid urbanisation. Observations from various studies carried out by Onekerhoraye (1977), Sada (1979), Mabogunje (2010), Aluko (2011) and others substantiate the opinion. However, the opinion is a clear departure from the experience in highly urbanised metropolitan cities in developed world, which should have faced more problems because of their population size. This assertion is consistent with the finding of UNEP (2002), which affirms that many urban land use problems are the aftermath of poor management, poor planning and absence of coherent urban policies rather than urbanisation. Their experience reveals that no amount of finance, technology or expertise can secure environmentally sustainable land development or protect the environment if fundamentals of governance are not participatory, democratic and pluralistic. In a similar fashion, findings from the studies carried out by Williamson (2001), Williamson (2001) and Deninger et al. (2009), on developing countries including Nigeria suggests a consistent opinion with UNEP (2002). Their findings reveal that one of the major reasons for poor landuse in the developing world is their relatively poor system of property rights and specifically their abysmally low level of property title registration. The studies reveal that many African countries possess established and quite progressive land use legislation, however, the gap between theory and practice remains quite large. For instance, the Land Use Act of 1978 provided that:

- *Save as permitted under Section 34 of this Act, from the commencement of this Act no person shall in an urban area*
  (*a) erect any building, wall, fence or other structure upon or*

(b) enclose, obstruct, cultivate or do any act on or in relation to, any land which is not the subject of a right of occupancy or licence lawfully held by him or in respect of which he has not received the permission of the Governor to enter and erect improvement prior to the grant to him of a right of occupancy.

- *Any person who contravenes any of the provisions of subsection shall on being requires by the Governor so to do any within the periods of obstruction, structure or thing which he may have caused to be placed on the land and he shall put the land in the same condition as nearly as may be in which it was before such contravention* (Land Use Act. 1978, Section 43 (1&2)).

Despite this legal provision, the enforcement of this law has recorded little or no success. For example, according to Fadairo and Ganiyu (2008), 59.7 percent of the houses constructed along Ala river in Akure did not observe the minimum setback. This contravention has led to the usual annual occurrences of flooding in the study area.

2.5 Land Management

Land management has been defined from various contexts. However, simply put, land management encompasses all activities associated with the management of land and natural resources that are required to achieve sustainable development (Enemark, 2007). The structure differs from one country to another and reflects local culture and judicial setting. Irrespective of the variations, land administration functions are its essential operational components that ensure proper management of rights, restrictions, responsibilities and risk in relation to property *(ibid*). According to Dowall (1996), Land management is the mechanism through which land policies are implemented for the achievement of land administration function highlighted in figure 2.1. Governments all over the world rely on some tools such as zoning master plans, subdivision regulations to achieve land management objectives. Irrespective of the policy tool employed, the principal focus of maintaining property values and environmental protection among others remains the same *(ibid*). However, its' goal and objective may not be achieved in countries where tenure rights is separated from

land use right; this is because there is no effective institution linking planning and development control with land values and the property market operation (Enemark, 2007). He concludes that the problem may persist if land is not treated as a coherent whole.

In a study prompted by a growing need to design residential property that respects human environment, Thomson (2013) emphasises the important impact of urban land management. However, he argues that the best land management design may not reach its full potential if the property owners do not comprehend the design and imbibe land use ethics of a good environmental steward. He noted that findings from various studies by psychologists, anthropologists, environmental educators and economists reveal that even, knowledgeable people and enlightened people often fail to use their property in a pro-environmental manner. With this behaviour, Thomson (2013) identified three potential barriers to individual land management (see table 2.1).

Table 2.1: Barriers to the Achievement of Land Management Functions

1	Barriers to recognising environmental problems: - The lack of ecological knowledge - The difficulties in recognizing the environmental problem of their actions
2	Internal barriers to taking pro-environmental actions: - The presence of defence and distancing mechanisms - The persistence of faulty cultural models - Inappropriate cultural model for living sensitively with nature
3	External barrier to taking pro-environmental actions: - The prevailing social norms against pro-environmental behaviour - The absence of social norms that support pro-environmental behaviour

Source: Adapted and modified from Thomson (2013).

2.6 The Nigerian Urban and Regional Planning Law

Land policy provides clear cuts statement on the way and manner required for the utilisation of land within rural and urban areas in any country. Specifically, land use policy framework is to ensure the use of land in an organized fashion, thereby helping to protect the maximum socio-economic benefits of the present and future generations of land users. Following the provision of the Nigerian Urban and Regional Planning Act Cap No.88 of 1992, each tier of government is saddled with the responsibilities of exercising her physical planning role within the framework of the National physical development plan to ensure consistency in physical development at all level of planning in Nigeria. In order to achieve efficiency, equity and sustainability, the policy attempts to match different land uses with the greatest benefit at the least cost by developing plans at the Federal, State and Local government through three public bodies listed below.

- National Urban and Regional Planning Commission (Federal Commission)
- A State Urban and Regional Planning Board in each state of the Federation (State Board),
- A Planning Authority in each Local government of the Federation (Local Authority)

The Nigerian Urban and Regional Planning law mandates each of the bodies to establish a development control department to regulate land uses within its domain.

2.6.1 Land Policy Objectives and Development Control

In Nigeria, the Development Control Department is a multidisciplinary Department charged with the responsibilities of controlling developments and the land policy objectives. The various Development Control Departments in each level of government exercise control on land development within their jurisdiction and provision of the law. As stated in Section 28 of the law, the approval of the relevant authority must be sought before anyone can embark on any use and development of land. It declares that the mere application for development on land does not imply permission to embark on a proposed development on land.

Worthy of note is the provision for grounds for rejection of applications. The law provides the following laudable grounds for rejecting an application for a propose land use:

- Where the plan is not in accordance with the an approved plan; and
- Where the propose use is likely to cause negative externality or nuisance to inhabitants of the community.

In case of contravention to development approval, the Development Control Department issues a stop work order to the offender. An enforcement notice follows this within 21 days of issuing the stop work order. This is done to ensure that the individual alters or removes the development from the land. The law made provision for penalty on a person who disregards the stop work order or fail to comply with the terms of reference of the enforcement notice. A landlord that goes against this law is guilty of an offence and liable on conviction to a fine of not exceeding ₦15, 000 and ₦50,000 in case of individual and corporate organisation respectively. Alternatively, the development control department may choose to carry out demolition on development considered as nuisance to the occupiers or the public. A demolition notice is served containing a date not later 21 days for the demolition exercise with the cost of demolition paid by the offender. As beautiful as the planning law appears to be, current land use in the residential environment of many Nigerian cities shows that there is a huge gap between the law and its expected effect. The few occasional cases of demolition of structure contravening planning are motivated by political propaganda with huge resistant from offenders. Consequently, most of the contravening developments resurface few months later after demolition.

2.6.2 Law, Exception and Social Order

According to Post (1994), the law commonly expresses itself through rules whose applications turns on the exercise of judgement. The rule of laws implies equality and justice in its application. It is the mucilage that guarantees social order in every society, when evenly applied to all. According to Edgerton (1985), if laws are so important for creating and maintaining social order, why are exceptions to them? He asked, why not state the rules explicitly and unambiguously, follow them and penalize whoever does not comply. He concluded by arguing that the hazard of

exception in laws to social order can only be avoided if we bear in mind that some rules solve problems why some create problems for some people. Exception is a commonplace in law. As noted by Mendis (2003), over 2500 years ago, organised societies based on laws recognised the need for exception based on people's status and other moral circumstances. He argues that as far as all societies allow exceptions in many laws, they also follow strict rules to disallow exception where need be. Holton (2010) argues that exception proves the rule and insistent that whilst there is an exception the rule still stands. While exception in laws is not a very bad concept, as it tends to maintain flexibility, however, when and where to apply it is a subject of wider issues.

2.7 Conclusion

This chapter has examined the key role of land administration in the determination of the property market outcome. The early section discusses the conceptual meaning of land administration and its essential function of a healthy balance between land tenure, use, value and development. While the function of land administration is generic, there seem to be no consensus on a unified system that could contain the peculiar challenge of every nation. Land nationalisation fails to eliminate the multiple land tenure that emerged from the multi-cultural society. Land rights, restrictions and responsibilities are equivocally defined. Consequently, land management and policy could not achieve the desired market outcomes. Chapter 3 advances this argument by drawing from the specifics of land administration to present a discussion on the property market situation in Nigeria.

Chapter 3
The Nigerian Property Market Situation

3.1 Introduction

This chapter discusses the residential property market in Nigeria with a view to achieving two aims. The first is to establish the state of the market, theorised from purpose efficiency conceptualisation. The second is to examine the possible contribution of land market and rental tenure sub-sector to the occurrence of negative externality. The chapter is structured into nine sections. Section 3.2 presents a discussion on the study area with a focus on its population size and its strategic socio-economic advantages over other urban centres in the state. Section 3.3 takes a contextual view of the characteristics of property market and efficiency. Section 3.4 examines normative economics and property market's efficiency. It focuses on the relationship between man and land and the emerging land market. Drawing from the critique of section 3.4, section 3.5 discusses the Nigerian land market. The section debates the characteristics of the major land market in Nigeria and reflects on their consequences on the emerging residential environment. Based on the reflection of the previous sections, section 3.6 presents an argument on wider issues in the housing market. Section 3.7 examines the housing market situation in Nigeria. It examines residential property supplier, which opens a debate on rental market and wider issues in various sectors from the Nigerian context in section 3.8. The last section presents a conclusion to the arguments in all the sections.

3.2 The Study Area

Akure is the capital city of Ondo State in Southwestern Nigeria. Its population size has tripled since it became the seat of government in 1975. According to the NPC (2006), it has a population of 360,268 and covers an approximate land area of 331km^2. By virtue of the political status of the city, it represents the commercial nerve centre and most populous city of Ondo State. Recent analysis of land use in Akure is not available and there is no evidence of significant changes to the previous record. According to Ayoade (1993), residential and service lands constitute the

highest and lowest land use; each represents 65.7 and 0.2 percent respectively. The breakdown of landuses in the city is as shown in Figure 3.1.

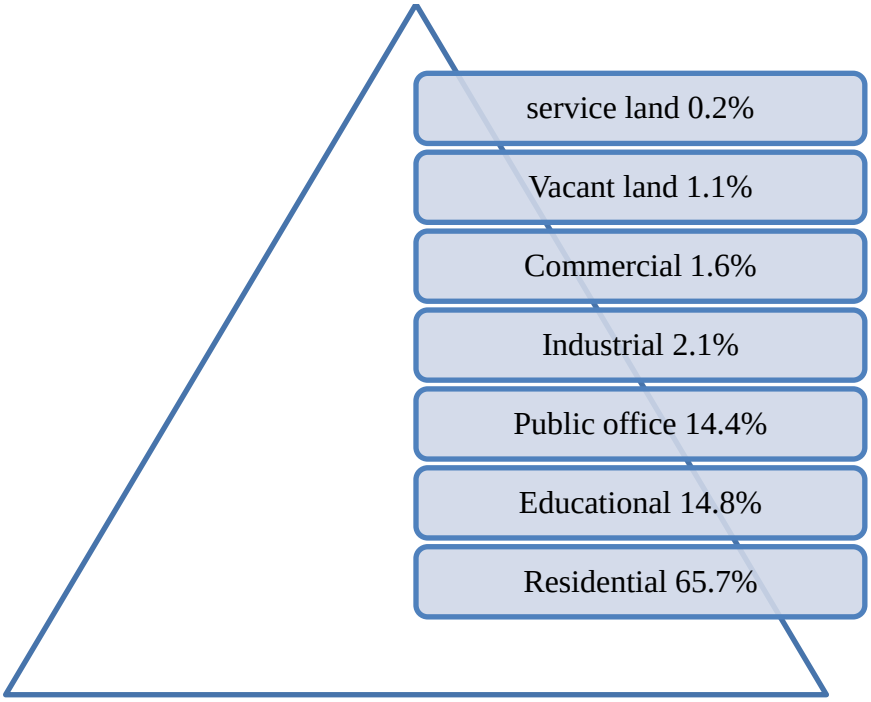


Figure 3.1: Analysis of Land uses in Akure

Source: Ayoade (1993)

3.2.1 Geographical Scope and Justification

Akure is located on longitude $7^0$15'E and Latitude $5^0$11'N of the equator. Less than 10% of the city constitutes public housing while over 90% of the city comprises of housing built on informal residential land. The problem that necessitates this research is generic throughout the urban centres in Ondo State; but Akure became a favourable case study for many other reasons. First, its huge population advantage over other urban centres facilitates selection of sample from a blend of population with varying characteristics. Second, transactions in residential property and its rental value are at peak in Akure compared to other urban centres in the state. Third, as a capital city, its land uses benefit from more intensive residential development control than other urban centres in the state. Lastly, the researcher familiarity with the city helps to eliminate the logistics problems involved in data collection. A pictorial representation of the location of Akure relative to Nigeria and Africa is as shown in Plate 3.1.and 3.2 show a typical multi-tenanted residential property with a grave in the Akure.

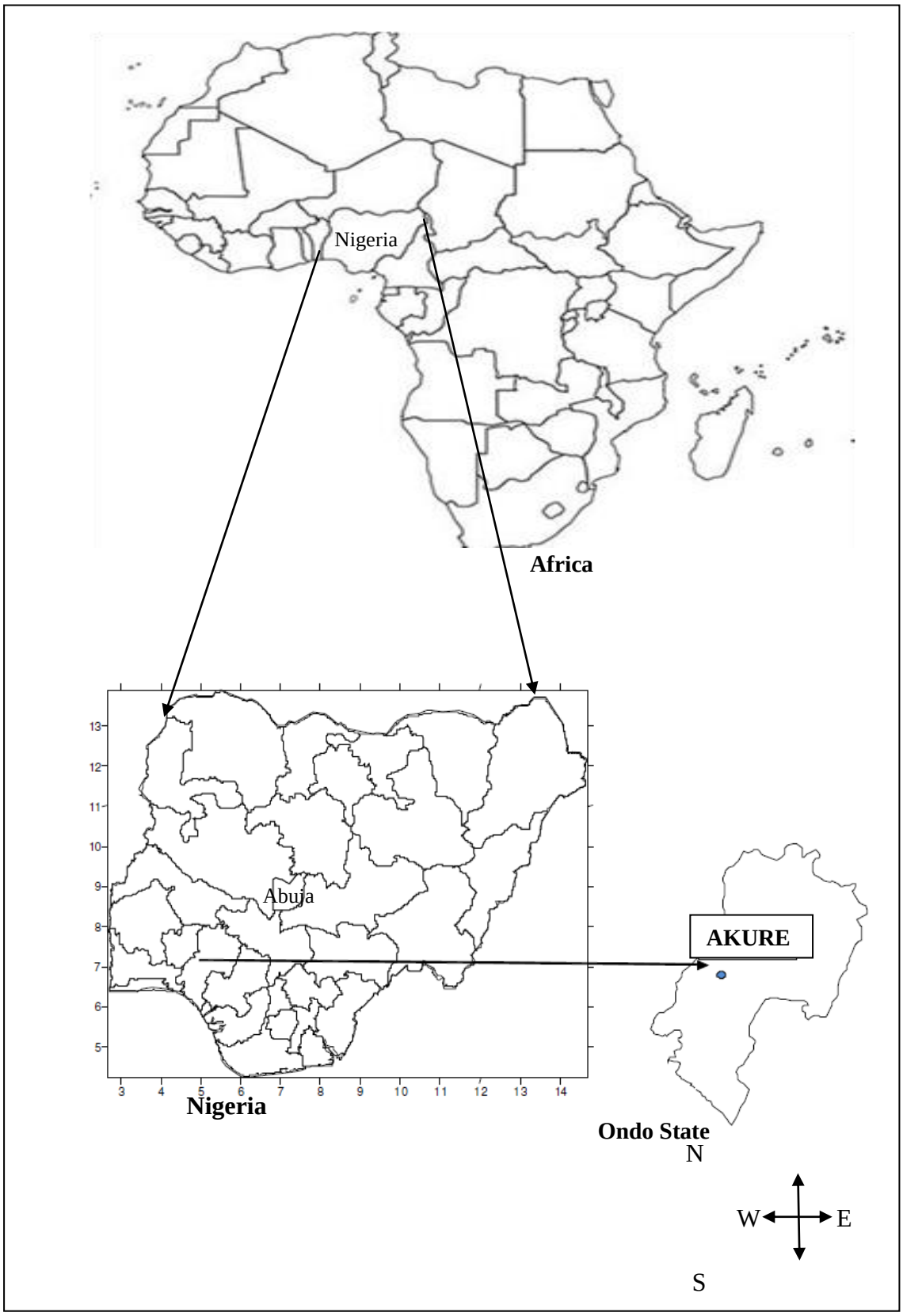


Figure 3.2: Maps showing Akure's relative location in Ondo State, Nigeria and Africa

Plates 3.1: A typical multi-tenanted residential property with a grave in Akure

Plate 3.2: A typical storey building with two graves in Akure

3.3 Concept and Characteristics of Real Estate Market

The property market describes the institutional arrangement through which real property is traded and developed. It involves a wide range of actors and professionals in the transaction process who act to ensure most allocation of resources in a competitive environment (D'Arcy and Keogh, 1999). It provides a framework (formal or informal) within which interest in property exchanges hands. Consequently, the institutional structure of the property market determines its ability to accommodate pressures for change in the urban economy. Evidence from Ingram (1998), shows that the property market process will affect the physical development of a city, the consumption pattern and its economic capacity.

Unlike the commodity market, real estate market is a peculiar market characterised by unique features. It is a market devoid of specific central location involving transaction in intangible interests embedded in immovable properties, which are hybrids of rental income and capital growth. According to RICS (2010), real estate market emerged when and where and wherever it is possible to exchange rights in property based on certain financial consideration or services. It is an economic mechanism of rationing land and landed properties among competing and occasionally conflicting users (Balchin, 1995, RICS 2010). It does not operate in isolation but highly influenced by fundamental economic factors that affect property value. Consequently, it is imperfect and mostly susceptible to changes in underlying social and economic conditions affecting property value (Sankoli et al. 2008).

In its varying contexts, value is prima-facie of a significant consideration to holders of real estate and other scarce economic resources. Among these contextual variations, open market value is of utmost importance to valuers and real estate investors. It is the priority of every rational investor to ensure that the value is maintained over time particularly when the housing investment is subject to debt financing. Hence, conscious effort is applied to guarantee best use that will maintain real value of property overtime. This concept has been misinterpreted to mean the same thing as price. Economically, the open market value of a residential property describes the amount of money a property would let assuming there is a willing tenant and a willing owner not renting and letting under duress, no negative externalities and encumbrances appurtenant to the property.

Dunse et al.(1998), Keogh & D'Arcy (1998) and Cheshire (2009) noted that any real estate is in a sense is the aggregate price of all its attributes, including the access it gives to local amenities and public goods. They stressed that this non-structural aspect of landed properties dominantly account for great majority of the total value in the real estate market. Inferences from the discussions in chapter two suggest that structural, neighbourhood characteristics and social order is contingent upon the enforcement of land management policy. This in turn determines the efficiency of the property market, which is the focus of discussion in the next section.

3.4 Normative Economics and Property Market Efficiency

Literature on the analysis of property market efficiency is large. These include but not limited to studies carried out by Balchin (1995), Clayton (1998), D'Arcy et al, (1999) and Arvanitidis (2006). Although, there have been massive contributions to the conceptualisation of efficiency of the real estate market, Arvanitidis (2006) argued that the concept is poorly developed and inadequately theorised despite the huge attention it attracts. He observed a misconception that presupposes an impracticable perfectly competitive property market from a normative point of view. He stressed that the conventional approaches of allocative and information efficiency provide problematic and ambiguous judgement, whereas institutionalism conceptualisations remain incomplete or methodologically underdeveloped. In his opinion, the efficiency of real estate market could be tested by its ability to sustain social welfare, economic development and urban competitiveness outcomes that are essential for healthy urban economy. He concluded that efficiency of the real estate market should be constructed with specific reference to a purpose, instead of passing a judgement that conceives the market as an entity. Arguably, the researcher lay claims to imperfection and inefficiency of the property market and established that negative externalities indicate inefficiency of real estate market. However, the fundamentals (rules and regulations) shaping the market structure received little or no critical attention. While partly agreeing with Arvanitidis's (2006) concept of single point based approach in measuring market efficiency, only perfect market is efficient in absolutely term but remains realistic in fictitious utopian.

Similarly, Keogh and D'Arcy (1999) re-examine the contributions of various scholarly publications on property market efficiencies and introduced an institutional perspectives. They observe that while inefficiency in the property market is not disputable, conventional property market efficiency approach unhelpfully compares market outcomes against a hypothetical pareto efficient world devoid of inefficiency. Their study reveals the ambiguity and problematic nature of the benchmark upon which judgement on efficiency focuses under the conventional efficiency approach. The allocative efficiency and the informational efficiency assess efficiency relative to some ideal. While the former based its judgement on pareto-efficiency in relation to certain ideal, informational efficiency based its judgement on inferred presence or absence of relevant property information. They attributed property market efficiency to specific characteristics of property itself and the channel through which property is utilised and traded. Keogh and D'Arcy (1999) provide a good critique of the major literature, which forms the basis of their judgement of property market efficiency, construe on conventional approach. Their opinion on contingent judgement, which emanates from conventional approach of measuring efficiency, is premised on three grounds. Firstly, conventional approach fails to take cognizance of the physical and the legal characteristics entity of the real property. Secondly, it provides an insufficient understanding of property market process as the channel through which interest in property changes hands. Lastly, they focus on informational efficiency to the exclusion of allocative and operative efficiency.

While the different contexts of conventional approach to market efficiency remain valid to an extent, the purpose efficiency is highly relevant to the focus of this study. From the various institutionalisms point of view, a triple pronged approach is proposed to assess efficiency of market. First, market efficiency should be constructed with specific reference to a purpose rather than the market as a whole. For instance, efficiency can be constructed on quality of housing emanating from landlords use of property rights.

Secondly, emphasis should be placed on both market outcomes and market process. Thirdly, cognizance should be taken of the flexibility in the dimension of the property market especially in terms of its adaptability to changing socio-economic, legal and political conditions. Expanding upon these three views, the efficiency of the property market has been constructed with reference negative externality on

residential property. This addresses the purpose of the property market with context specific relevant as to its commitment to delivering property outcome that protect social welfare of the tenant and the rental value of their property. Using this parameter, Avarnitidis (2006) argues that an efficient property market is expected to deliver enough supply of property meeting the expectation of the potential consumers at the prevailing price.

In order to avoid confusion in the arguments propound by this concept, Arvanitidis (2006) highlights some of its limitations. First, purpose efficiency is an important but not enough condition for the achievement of economic potential. Secondly, a market's purpose efficiency only provides context specific reference, to discovering and resolving problems. Thirdly, property market purpose efficiency evolves from structural peculiarities and noticeable imperfection exhibited by the market and responds to this by putting forward a conceptual benchmark that is realistic and practical. With these clarifications at heart, a market can still be purpose efficient in the presence of high transaction costs and information asymmetry that are the classic cause of market failure *(ibid)*. The efficiency of the property market is conceptualised from the purpose specific perspective rather than the traditional ambiguous conventional concept. The next subsection presents present a discussion on the man relationship with land, which determines the efficiency and structure of the market.

3.4.1 Man's Relationship with Land and the Emerging Market

A quantitative view of the relationship between man and land provides a fundamental insight to a growing market caused by population changes and demand pressure. Due to the multifarious nature of human endeavour, man land relationship is subject to many trade-offs between socio-economically diverse interests. In the urban area, man relates with land for the provision of residential property, transport, industry, commercial development and community service (such as cemetery, church, mosque and open space). The management of these trades-offs among successful use is often determined by the prevailing market forces and planning. According to RICS (2010), the development and maintenance of land market involves interactions of complex, economic, social and cultural issues, legal frameworks, fiscal policies and environmental control. Based on this background, it

is globally recognised that the ownership and use of land can be accessed through formal and informal institutions with appropriate checks and balances to enhance most economic use.

In Africa and many other developing countries, it is evident that land markets are mostly informal and largely underpinned by relatively weak legal institution (Maxwell 1996; Dale 2000; RICS 2010; Mabogunje 2010). According to Mahama and Antwi (2006) and Boamah (2013), most transactions in the Ghanaian land market take place outside a formal setting and the operation of land and property market are not regulated or transparent. Specifically, their observation is buttressed by the fact that 90 percent of the land market in Ghana is controlled by informal transactions with a minimal government intervention (Kasanga, 2008). A study carried out by Antwi and Adam (2003) on informal land market in Accra revealed that 64.5 percent of the landlords have developed and occupied properties without planning permit. Findings from two separate studies by Akrofi and Whittal (2013) and Antwi and Adam (2003) in Accra and Kumasi show that many lands that were formerly acquired by the government have been re-occupied by the owners and illegally sold out to people through the informal market. The resultant effects of this phenomenon are widespread informal developments without the element of planning.

In Nigeria, research findings from Mabogunje (2010), Aluko (2010) and Butler (2009) reveal a land market that is similar in characteristics and structure with the land market in Ghana. With this situation, Mabogunje (2010) concluded that such unguided market produces urban spatial structure that compromises the principle of equity, convenience and sustainable urban development. For instance, with respect to land use change, Fawehinmi (2002) reveals that changes in residential land to commercial and other uses are market driven in resource allocation in Akure and many other Nigerian cities. He observes a market operating in isolation but requiring an integrated land policy approach to operate efficiently. Using the paradigm of man relationship with land, section 3.5 discusses the structure of the Nigerian land market.

3.5 Nigerian Land Market

Nigeria had a long history of private land market before the advent of the colonialist, which exercises a great influence on the market. The colonialist came with the idea of pareto improvement and equity in land allocation. The central focus of the idea was to create a formal market that protects the interest of all through nationalisation. This is achieved by the enactment of the Land Use Act Decree no 24 of 1978.The Act vests interest in all land in each State of the federation in the State Governor. However, a proviso in the law allowed those presently in occupation with their possessory right as if they own Certificate of Occupancy (C of O). Arguably, attempt to create a formal land market by the land law culminated in the emergence of a vibrant informal land market that did not previously exist (Butler, 2009; Mabogunje 2009) (See section 2.33 for more information). Inferences from the aftermath of the Land Use Act show an emergence of three distinct land markets discussed in the next subsections.

3.5.1 Government Allocated Land

Government allocated land constitutes the formal land market. It is a direct offshoot of the Land Use Act of 1978 and a product of an attempt to develop allocation efficiency, which the informal land market fails to address. This market deals in the transaction of land rights with an unexpired term of 99 years after which a holder of C of O could either renew his right of occupation or concede the reversionary right to the Governor of the State. This market provides serviced land to people in each state of the federation. However, its impact is constrained by political willingness to acquire more land, default in payment of compensation to original owners of acquired land and consequent repossession by original landlords and the extent of available unused land. As a result, insignificant achievement has been recorded of its potential contribution to land market. Further, the patronage of this market remains low due to delay in processing time and element of corruption as well as nepotism. The market is skewed towards the minority high and middle-income groups at the exclusion of the low-income earners (Butler 2009; Memoire 2010). This exemplifies the supposed low cost residential housing estates occupied by people in the middle and upper echelon. The need for access to urban land by the poor majorities remains

unresolved by the formal markets; this paved way for booming informal land market in the urban areas.

Statistics on the volume of transactions in the market is difficult to find, however, Butler's (2009) investigation in two Nigerian metropolitan cities namely Lagos and Kano reveals that the government land presently account for less than 1%. He notes that transactions involving Certificate of Occupancy with Governors consent accounted for less than 25 percent while over 70 percent of the rest were traded in informal market consisting of trade in pre 1978 land rights and trade in statutory land rights without Governors consent or registration. Despite all the impediments surrounding the delivery of land through this market, it is appreciated that the process of right transfer and the definition of the quantum of rights transacted is explicitly defined such that, the extent and restrictions of use are clearly spelt out and understood by the grantee. This explains the reason why the residential market can be considered as purpose efficient, with specific relevance to prohibition of graves on residential land.

3.5.2 Quasi Informal or the Pre 1978 Land Market

The quasi-informal land market emerged from the permission granted the original holders of interest in land before the enactment of the Land Use Act. By virtue of the provision of this law, landlords are to continue occupations as if they were holders of C of O, which form the only legal basis under which an individual can claim a right of occupation enforceable at laws after the promulgation of the Act. It involves transactions between would-be buyers and original landholders who are granted permission to continue occupation and dispose their interest, subject to acquisition of Occupancy and Governor's consent. Unfortunately, over 70 percent of the land transactions here are without recourse to Governors consent permitting such transaction in this market. The market is characterised by information asymmetry. In a study carried out by Adlington et al. (2000), they note that a major barrier to this type of land market in transition economies is the lack of clarity in lands' rights. Consequently, misuse of land, investment risk, inhibition of property transaction and increase transaction costs are common.

3.5.3 Informal Land Market in Nigeria

Informal land market is illegal, having no differences with private land market that were in operation before the promulgation of the Land Use Act of 1978. This market is largely regarded as the land market for the urban poor (Sivam, 2002; Rakodi; Leduka, 2004). Here the 'Omo-Onile syndrome' (the sons of landlords) is a common phenomenon. Land parcels are freely traded in the market by the 'Omo-Onile' without any formal records, and transactions are largely fraught with fraud. Given this background, the quantum of rights transferred to buyers is considered absolute since there is no blue print stating restrictions to right of use, which are binding on the new occupiers. Unfortunately, the informal and quasi-informal land market remains the surest means of accessing land in Nigeria (Adedipe et al. 1997; Mabogunje 2010).

Inferences from the Nigerian property market show that, though the quasi-informal market presumably operates within the ambit of the land law, the difference between this and the informal land market is completely insignificant. The two dominant land markets could be described as the market of the highest bidder, lacking element of social motives. The summary of the characteristics of the three operating land market in Nigeria is as shown in Table 3.1.

Table 3.1: Characteristics and Issues in Nigerian Land Markets

Market	Characteristics	Issues
Formal Land Market	Direct State Land Grants Most new lands need to be taken by the state from current occupants, who may hold equitable rights and be entitled to compensation First-come-first-served Deep subsidies regardless of wealth or use Development covenants	Scarcity – opening up new lands Compensation issues associated with compulsory state land acquisitions Misdirected subsidies Speculation - development covenant rarely enforced Inability to deliver infrastructure Inadequate generation of state

	Required infrastructure contribution	revenue Long lag times between "paper" allocations and actual delivery of sites Illegal occupation - squatting
Quasi Informal Land Market	Trade in Statutory Rights/Certificates of Occupancy Mostly Registered Land Rights Common law convincing rules and procedures	Burdensome land transaction procedures – the "Governor's Consent" Burdensome official fees for land transactions Growing incidences of informality – tax/fee avoidance.
Informal	Pre-1978 Land Rights – "Customary" rights No statutory certificates of occupancy Equitable right to obtain a statutory certificate of occupancy Characterized by unregistered transfers of title documents using common law conveyance rules and procedures	Burdensome land transaction procedures and official fees discourage formality Strict and (arguably) inflexible standards for establishing valid pre-1978 titles and converting to statutory rights Long delays in the conversion of pre-1978 rights to statutory rights of occupancy. Widespread abuse of property rights. Incompatible developments and negative externalities. Gender discrimination

Source: Adapted and modify from Butler (2009).

3.6 Housing Market

Despite the recognition accorded housing as one of the three necessities of life, its provision remains a huge challenge in Nigeria. According to a survey of findings from different studies carried out by Malpezzi (1990), Hoffmanet al, (1991), Rakodi (1992)World Bank (1993), UN (1996), Angel and Mayo (1996), Malpezzi (1999), , and UN (2011), the bulk of the housing market behaviour in developing and transition countries is remarkably similar. There are variances in restrictions and the institutional set up among different nations' housing markets, however, these do not obscure regularities in their basic behaviour.

3.6.1 Conceptual Framework for Housing Market and Efficiency

Irrespective of the differences in the institutional set-up, restrictions and workability of the housing market in the developed and the developing countries, the conceptual framework shown in Figure 3.3 remains the same. The market involves a constant interaction between land, landlords and renters or buyers. The nature of the land market in any nation goes a long way to determining the efficiency of the housing market. Normally, an efficient land market specifies the rights and restrictions conferred on the landlords and this in turn affects the housing market. With this background, Malpezzi (1999) argues that three implicit features are crucial to efficient transactions across the housing market. They include:

- Transactions are only possible between a landlord and a tenant to the extent in which property rights are defined, recognized and enforced;
- Government intervention can have an effect on the operation of the market; and
- An understanding of the regulatory environment.

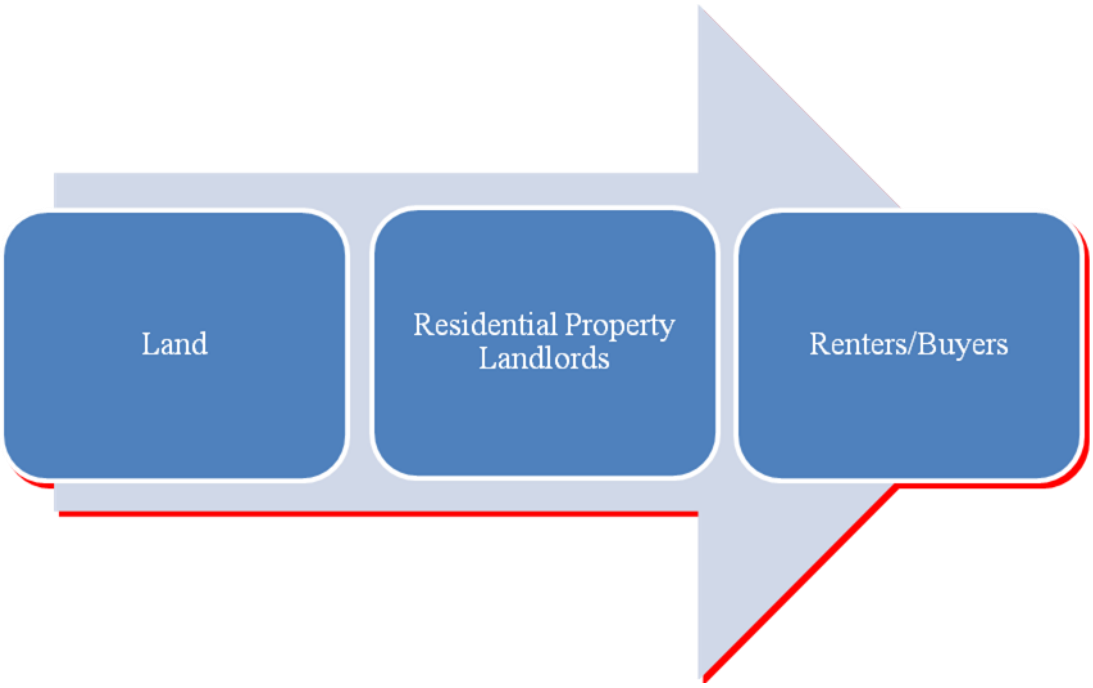


Figure 3.3: Conceptual paradigm of the Housing Market

3.6.2 Property Rights and Market Practice

Issues in property tenure have been well documented in the literature (See Malpezzi 1999, Kiamba 1989; UN, 2011 and others); however, the issues and focus varied from developed world to developing and transition countries. Globally, most of the debates on property rights had been largely linked with tenure security and lately gender discrimination in many developing countries. The focus in developed world such as the UK and the United States is on increasing home ownership with provision of social housing, which operates on mid-market rent. In transition countries, the attention on property right is gradually shifting from tenure security to increasing home ownership among households. From a wide perspective, an attempt to recalibrate property rights is demonstrated in land nationalisation to promote equitable access to property right. Concerning housing rights in Nigeria, a lot of programmes have been embarked upon (for example, National Housing Contribution and the establishment of Federal Mortgage Finance Bank) to increase home ownership rights but their contribution remain insignificant. Useful contributions has also been made by the government to enhance tenants' property rights to fair rent by the enactment of rent edict, which places ceiling on the rent. However, these attempts have failed to protect tenants' rights to fair rent. This exemplifies the

enactment of rent edicts in 1997 and 1985 in Lagos and Ondo State, which could not protect and secure tenants' property rights. The legal framework has remained very feeble in standardisation of property rights. This exposed tenants to premature decision to change accommodation given a continuum of unregulated landlords' property rights. In the event of negative externality arising from misuse of rights, tenants are in a dilemma to decide whether to continue occupation or willy-nilly move home. The impact of this is a huge loss, which may result from damaged properties in transit. The economic effect on renters is common in Nigeria and most developing countries where residential properties are often let in unfurnished state. Therefore, in the face of diffused property rights, it is imperative to establish that the Nigeria property market present a picture of a market, where renters' security of tenure is under continuous threat.

Issues in property rights, which affect the housing market, may be common among some countries and different among nations and continent. As discussed under land markets, property rights can be acquired through a formal legal arrangement and by custom and tradition in the informal market. According to Malpezzi (1999), two aspects of the law determine efficiency of transactions in housing markets. They include contract law and land use regulation. Contract law facilitates the transfer and define property rights being transferred from landlords to tenants particularly through a lease agreement. Findings from descriptive survey on property rights in Africa, reveals a clear flux in property rights transfer (Malpezzi 1999; Kiamba 1989; UN, 2011). In Nigeria and many developing countries, both formal and informal systems determine the transfer of property rights. They suggest that, for efficiency in the housing market and to maximize the social value in housing markets, the law and regulations governing the market must possess vital characteristics. The rights must be well-defined, transparent, agreed upon and enforceable at reasonable cost by the parties involved. Clear remedies for violation by either party must be provided to prevent spill over cost. In the light of property rights, subsection 3.6.3 discusses how the concept of Not in My Backyard (NIMBYism) can protect tenants' social welfare.

3.6.3 Not in My Backyard (NIMBYism) and Tenants Rights

The concept of Not in My Backyard (NIMBYism) is cast in positive perspective in the context of this study. This opposes the negative view it portrays on some

Landlords who are resistant to change and development of new housing within their community in the United Kingdom and the US. The construction of new developments close to existing ones are considered as invasion of personal space by landlords but labelled as selfish, petty jealousy and a bad idea among some urban analysts (Rydin, 2011). This raises a question on what is more important between common good and individual property right. People should have a say on land use decision that affects them and put the society's interest ahead of Landlords' (*ibid*). As argued by Morris (1994), everyone is a "Nimby", forced to speak out when a use of land capable of affecting his or her welfare is set to take-off. In a similar fashion, Kunzlik (undated cited in BBC 2002) argues that the instinct to be a Nimby can be valuable; Nimbyism can be for the greater good. He pointed out the emergence of a communiqué on the need to Think Globally and Act Locally on environmental issues. Government claims to want everybody to do that, and so far as the environment is concerned, where do you experience it? It is where you live *(ibid).* Landlords have explored the concept of Nimby to protect their interest, particularly when a development portends threat to quality of life and property value (*ibid*). While this concept have worked for Landlords, where does it leave tenants who are faced with emotional harm, harm to social welfare, loss of peace of mind and visual blight?

Based on the argument put forward by Kunzlik and the global agenda on environmental protection, the study examines tenants' rights and ability to act as Nimbyies. A review of tenants' rights in developed, transition, and developing countries shows a commonality. These are highlighted below:

- Right to reside in a residential property that meet the require safety standard;
- Right to reside in a residential property, in tenantable condition for letting purpose and free of defect; and
- A right to know the details of the terms and tenancy agreement.

Landlords' responsibilities on their leased homes, enhance the tenants' ability to say Not in My Backyard to a landuse that is capable of affecting their social welfare. Some of the landlords' responsibilities are as follows:

- The landlords must allow tenants' to enjoy their unexpired term without "disturbance"; and

- Landlords must ensure that the residential properties comply with building regulations and environmental laws.

With the above provision of rights in a standard lease agreement, enforcement may remain a challenge since a right is not an action in itself. Landlords are duty bound to perform their responsibilities. However, ignorance of property rights on the part of tenants and what freedom to negative externality means can limit the potential benefits of Nimbyism (Rydin, 2011). Tenants have limited rights on a leased residential property, but inability to enforce the rights within the institutional context of the market creates a negative externality on them. According to Malpezzi (1999), property rights profoundly affect the housing market efficiency and other social goals. This may become more problematic when there are unrestricted ownership rights in the hands of the landlords. Debatably, tenants have the capacity to act as Nimbyies, however, it is the job of the government policy to balance collective and individual interest, otherwise tenants' rights would become hypothetical in the housing market Kunzlik (undated cited in BBC 2002).

3.7 Nigerian Housing Market

Evidently, studies by Mabogunje (2007) and Akeju (2007) succinctly reveal that a substantial part of the housing provision in Nigeria is achieved through the traditional tortuous method. It involves incremental building method, which often starts with the acquisition of a plot of land while a series of small developments through personal resources and efforts follows. The development may be left for an indefinite period at a particular stage (for instance foundation) and later continues as fund becomes available. Consequently, most housing developments span for a long time and perhaps over the life times of the landlords. Arguably, this observation testifies to the reason for strong attachment to residential housing among owners, which culminates in the few cases of disposal of ownership interest.

Due to the large population of over 150 million and a massive housing deficit of 14 million, Nigeria apparently offers vast housing market. This offers a vista of opportunity to both individual and corporate investor wishing to invest in residential property. However, the housing market is grossly under-developed and accounted for less than 10 percent of the gross domestic product (FMB, 2005). According to

Adeleye (2008), home ownership in Nigeria is less than 25 percent, which falls short of international benchmark of 75 percent ownership expectation in every country. He also noted that the average occupancy ratio is six persons per room of $20m^2$, while 60 percent are living without adequate shelter.

The motive behind investment in the housing market emanates from two opposing philosophical views. The first school of thought believes that housing is an investment good expected to generate a stream of rental income overtime with possibility of capital gain. The second school of thought considers housing as social good and an inherent right of households that should be made available at a cost lower than the open market price. The next subsections discuss housing provision from the two schools of thoughts.

3.7.1 Public Sector Housing Market

The supply of public housing to the market enjoys a measure of stratification from two major actors. The actors include the Federal and State Government; their contributions to the housing market are discussed below.

(i) Federal Government Contribution to Housing Market

A significant government intervention towards the provision of affordable housing particularly for the low-income earner was witnessed during post-independence period and the third national development plan (1975-1980). Unfortunately, not all these efforts produced the desired result due to poor implementation. For instance out of 202,060 housing units proposed for construction during this period, less than 15 percent were completed. The rest are at different uncompleted states, remain visible landmarks dotting different parts of various states to date (Omole, 2002).

Also, during the fourth National Development Plan, an elaborate National Housing Programme was embarked upon in 1980 based on the concept of affordability and citizen participation (Lawal, 1997). The target population was the low-income earners and middle-income earners whose annual income did not exceed ₦5000 and ₦8000 respectively. Forty thousand housing units comprising of one and three bedroom core housing were to be built annually and 2000 units were to be located in each state capital including the Federal Capital Territory. This was a colossal failure

as overall achievement was only 20 percent after the first phase. Worst still, the second phase of the programme could not take off in so many states (Omole, 2001).

Another theoretically plausible attempt to assuage housing need in Nigeria was the establishment of National Housing Policy in 1991 to ensure that all Nigerians own or have access to decent housing at affordable cost by the year 2000. One of the cardinal objectives of the policy programme was to enhance the fulfilment of the objective of housing for all in the new millennium by constructing 121,000 housing units throughout the country between 1994 and 1995. Omole (2001) noted that apart from 1,114 housing units completed in Kado Estate and commissioned on 15th December, 1994 there is no other evidence of completion of similar project in other state of the federation.

Though the government attempts at providing affordable housing have not produced the desired success, it is worthy of note that the failure was mainly due to poor implementation. Due to the insignificant success recorded by the Federal government through direct involvement in housing provision, it shifted her role in the market to an enabler. The Federal government further demonstrated her intention to withdraw from direct involvement by outright disposal of all her residential properties in all States of the federation in 2005. According to National Economic Empowerment and Development Strategy (2004), the new role of the government is to provide an enabling environment and stimulate a private sector led industry with the participation of the State and Local government as necessary. In line with the new role and the National Housing Policy (2005) the State governments are expected to play the following roles:

- Formulation and implementation of State- related housing policies and strategies;
- Overseeing the activities of the state housing development corporation; and
- Proposing and implementing the housing programme and initiatives of the State.

(ii) Housing Provision at State Level

The condition of public housing market in Ondo is a replica of public market housing sector in many States in Nigeria. It was recorded that idea of public housing

supply was jettisoned for 35 years after the first solo efforts made by the first civilian administration in the state. The State's efforts in the housing market within the period of withdrawal was only visible in its Site and Service Scheme carried out by the Ministry of Lands to provide serviced land to individual for residential housing development. The State has a few number of housing units located in seven Government Residential Areas (popularly called G.R.A) viz; Ijapo Housing Estate, Oba-Ile, Sunshine Royal Garden, Sunshine Housing Estate Ibule, Oba-Afunbiowo Estate, Okuta-Elerinla Estate. Plots of land are also allocated to individuals in the G.R.A's for residential building, which must conform to development control ethics. A renewed commitment to provision of public housing by a new Governor in 2008 halted the long abandonment of public housing provision, however, while 382 housing units were proposed for construction in two new Residential housing estates (Sunshine Garden Estate and Heart Care Garden Estate) only 210 units have been completed after the project was initiated two years ago.

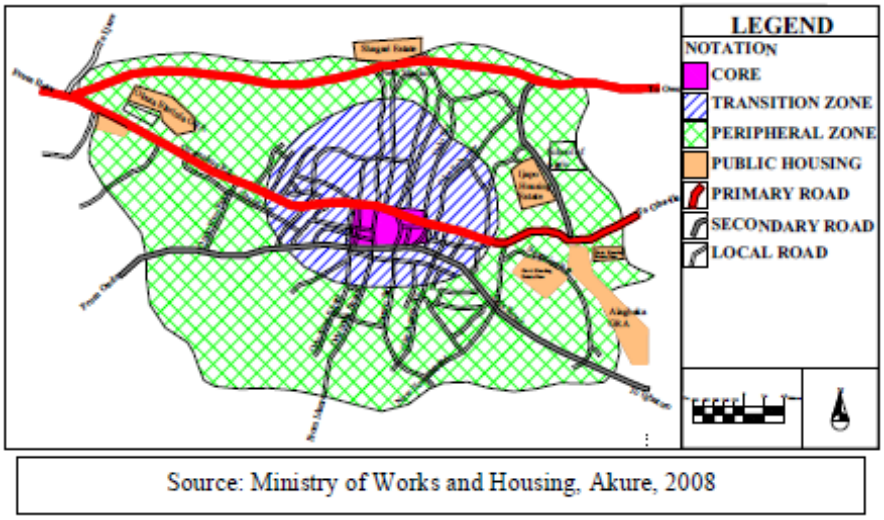
3.7.2 Organised Private Sector Contributions to Housing Development

This group is otherwise known as property developers, their involvement in property development is premised on optimum pecuniary reward. The shift in government role in the housing market from housing provider to facilitator has implicitly placed more responsibilities on property developers whose activities largely remain visible in the metropolitan cities of Lagos, Abuja, Kano and Ibadan. The developers' expectation of huge housing delivery as recognised by the National Housing Policy is hampered by the inability of the government to provide an enabling environment in which they can profitably operate. Consequently, the dearth of vibrant mortgage bank compelled developers to focus their attention on the provision of housing units affordable by high-income earners who can pay by cash. This observation is confirmed by Gbadeyan (2011), Daramola (2006) and other studies carried out on private sector's contribution to the development of Nigerian housing market. Akinbogun (2007) noted that the first major attempt by private developer (Zion Estate Development Limited) failed because of low level of affordability. His survey on sampled population's affordability level shows that 97.14 percent could neither afford a serviced plot nor a completed building within the estate. Only 2.85 percent of the randomly selected respondents have the wherewithal to afford service plot.

After over two years of offer for sale of the few completed housing units, only three units were sold while five plots out of the over 700 serviced plots earmarked for sale were sold.

3.7.3 Private Individual

The contributions of private individuals represent the largest and surest means of housing provision in the study area and virtually all Nigerian cities. This is moreso due to the poor or non-existing mortgage financing, which forces most homeowners to engage in self-help. As shown by the portion of Figure 3.4 with green cross sections, private housing in the study area is quite large in Akure. The portion with brown cross-sections represents GRA's, which exists in pockets of insignificant proportion. This implies that the housing market is largely dominated by the private individuals. According to Fasakin and Ogunmakin (2006), more than 70 percent of residential plots of land sold in Akure were in private layout. Their investigation examined the ratio between application for Certificate of Occupancy on private and public land. It was discovered that out of 3,982 applications received between 1999 and 2003, 2654 representing 66 percent were from landlords on private layout while 34.4 percent were received from landlord occupying public land. Their findings show that private individuals on informal land dominate the housing market in Akure.



Source: Ministry of Works and Housing, Akure, 2008

Figure 3.4: Map of Akure Showing the Relative Contributions of Private and Public Sector to the Housing Market

3.8 Concept of Renter Housing Market

A large proportion of the households live in rented apartment in African cities. According to UN (2011), millions of people in Africa are currently residing in rented apartment. For several reasons, it is difficult to get reliable statistics on the number of household residing in this type of apartment in the cities. However, statistics on this shows that 57 percent of the Household in Kumasi Ghana live in rented apartments (ibid). In Addis Ababa Ethiopia and Kisumu Kenya, 57 and 82 percent of the households lives in rented apartment. Rental agreements are largely informal and concluded outside legal regulatory framework. This makes legal redress to be difficult for tenants when abuse of property rights occurs (UN 2011). According to the O.E.C.D (2005), Nigeria has one of the largest rental housing markets in the world with 90 percent of the households living in the rented apartment as shown in Figure 3.5 Egypt and Germany with 63 and 59 percent of the renter-housing sector followed this respectively.

The stocks of the housing supply by this subsector are both from the formal and the informal markets. The classification of this housing can also be based on the institutions that are responsible for its provision, namely social housing and private housing renter sector.

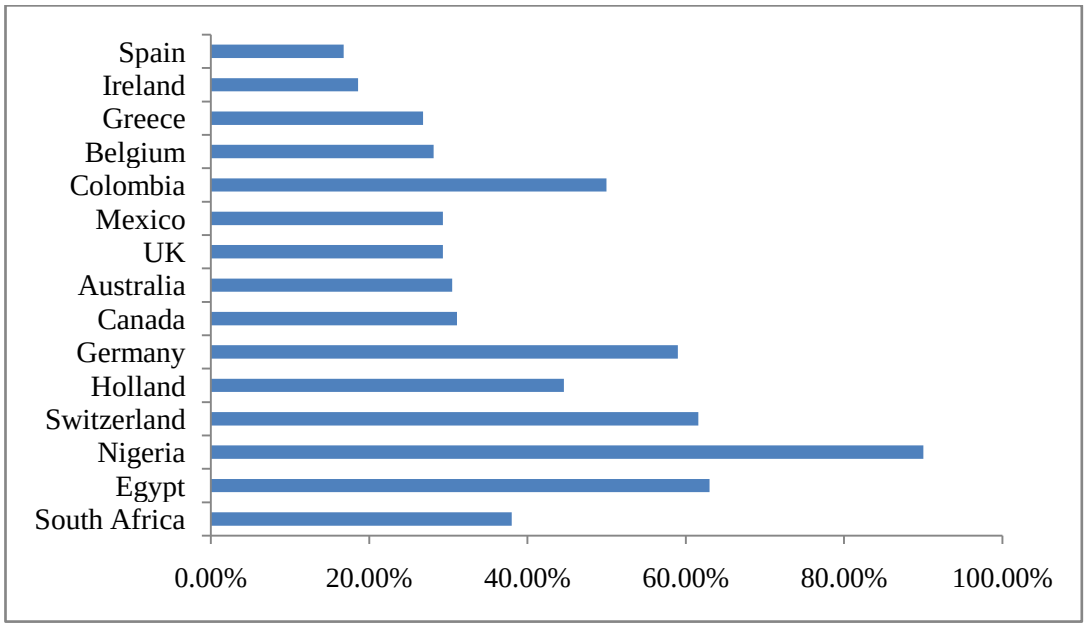


Figure 3.5: Size of Renter Housing Market across Selected Countries

Source: Adapted from OECD (2005)

Broadly, speaking, the rental sub-sector offers an important safety net for households that are unable to ownership of their own homes. According to Wallace (2012), tenants' perception of tenure attributes is generic across all forms of tenure from the users' point of view. Three classifications are possible, they include; the legal, psychosocial and economic attributes. The psychosocial characteristics include the psychological, social and cultural status benefits and disbenefits associated with various apartments. Economic attribute; include the extent to which a residential housing enhances or diminishes the willingness to pay (Fitzpatrick and Pawson, 2013). With respect to the Legal attributes, ideally, a tenant would want to know the distribution of the legal rights especially 'use' rights and restriction. Extending this argument, MacLennan (cited in Fitzpatrick and Pawson 2013) notes that the legal attributes are important to the realisation of the psychosocial and willingness to pay on a residential property. Although the renter sector does not benefit from absolute fixed tenure security, it remains an important element of the rental tenure *(ibid).* From the above argument, it emerges that security of the rental tenure is contingent on the legal, psychosocial and economic attributes desired by the tenant. According to Hulse et al. (2011) Security of tenure's definition is rarely precise in literature. However, Fitzpatrick and Pawson (2011, p.1) "conceptualizes it from housing policy and research as the legal arrangement, which offers households an indefinite right to occupy their homes, subject to moral concerns and proven breaches of their lease agreement that provide grounds for termination action by their landlord." Irrespective of the conceptualisation, tenure security remains one of the challenges of the PRS. Attempts to alleviate the security of tenure culminate in the government intervention through social housing, which is the focus of the next subsection

3.8.1 Social Rental Housing in Nigeria

Essentially, there are three related reasons why countries have involved in the provision of social housing (Hills, 2007). One of the three reasons is externality; others are merits good and paternalism. Concerning externality, he advances the argument that there are ways in which one's person housing consumption affects others. If a person's residential property falls into decay, problems may spread next door. If a property is in visible deplorable condition, the perception of the neighbourhood may be affected, consequently influencing quality of life of others

and perhaps property values. Seeing visible neglect of a property and its surrounding may lead to others neglecting theirs, setting up a wider downward spiral (Hills 2007) (see detail discussion externality in chapter five). He concluded by arguing that the provision of social housing is an attempt to secure minimum standard for the people. Unfortunately, due to the need to reduce welfare expenditure and waste in Nigeria, government tends to withdraw from the provision of social housing and instead adopt a neo-liberalism economic approach. There are evidences to suggest the impact of social housing on the occurrence of negative externality in Nigeria as suggested by Hills (2007). Largely, this explains the reason why the phenomenon of negative externality of residential property with a grave does not happen in Government Residential Area (GRA) in the study area. Therefore, the research gives little attention to the social housing renter sector, as it's tangential to its focus.

3.8.2 Private Rental Sector (PRS) in Nigeria

Private rental housing market is an integral part of a well-functioning housing market, which operates differently from city to city. In Nigeria, individuals in the private sector provide the substantial part of the rental housing stock (UN, 2003). Statistics on the contribution of the sector is difficult to find, however, it is obvious that the role of this market is not residual. Substantial percentage of the low and middle income resides in houses provided by the Private Renter Sector in Akure and Nigeria. According to Akpom (1996), individuals who occupy a flat in the building (or rooms in case of rooming apartment) and let out the remaining part provide most of the housing stocks in this sector. The private rental market is often located on informal settlement and enshroud in illegal use of property rights, which often lead to loss of social welfare. This market suffers a negative reputation, which is normally caused by tenants' perception of landlords' disposition to letting substandard property (UN 2011). Further, they often usurp property rights to cause negative externality on tenants. In cities with serious housing shortages particularly for low-income, unscrupulous landlords abuse property rights knowing that tenants have little or no option but to endure the exploitative and illegal rental conditions because they lack the financial resources and the ability to take legal action against them (UN 2011).

In a similar fashion to the structure of the PRS in Nigeria, the small private landlords are dominant in the United Kingdom, Canada, and France, Russia, Mexico and many other Latin America nations. However, the point of departure from the similarities is that the contributions of private tenants are characterised by negative externality in Nigeria and many African Nations. From policy point of view, UN (2011) identifies four major challenges with the rental housing market. First, housing policies in Nigeria are often biased in favour of home ownership; this lives most tenants on private rented housing sector at the mercy of the landlords. Secondly, the city's overall housing conditions and complex socio-economic conditions is a major challenge. Thirdly, a good number of the rental housing stocks are in the informal market and outside the control of government rules and regulations. Fourthly, most of the housing policies do not meet the conditions for acceptable rental agreement.

Consequent upon these biases, insecurity of tenure remains a major challenge in the private rental sector in Nigeria. Similar to some of the issues raised in tackling this phenomenon by Crook et al. (2009) and Rugg & Rhodes (2008, cited in Fitzpatrick and Pawson 2013), the perception of insecurity of tenure in the private renter sector in Nigeria have been misguided contrary to popular opinion that:

- Most private sector tenants do not move home against their wishes;
- Most private rental tenancies are ended at the instance of the tenants and not the Landlords; and
- Most tenants are not bothered about the use of common path that may erode their social welfare.

Due to the misconception of issues affecting tenure security in the private rental sector, government has responded through the promulgation of Rent and Premises Recovery Law, but the achievement remains mere wishes. Tenure security in this sector is a major challenge caused by landlords. While home ownership appears to be a good idea to overcome the insecurity of tenure in the Nigerian PRS, there is no empirical evidence suggesting its ability to do it if the market regulatory mechanisms are not addressed. Similarly, observations suggest a higher chance of tenure security in social housing market than PRS, but its wider application is not economically feasible.

3.9 Conclusion

This chapter reviews the property market in Nigeria with the achievements of two aims in mind. Typical of the rental housing in other countries, two types of sectors namely, social housing and Private rental housing are evident in Nigeria. As government stance on housing tends toward neo-liberalism, the size of the former remains very small while the latter is dominant. With regard to purpose efficiency in the residential property market, there is a dichotomy between the rental housing sectors. There is no evidence of legal dualism in the property market regulatory mechanisms as review in chapter two, however, it is evident from the critique in this chapter that the purpose efficiency of the market is in a controversial position. While the private rental sector is typified by widespread poor residential environment, the social housing tenure appears to be more efficient in this regard. From this critique, it is established that there is a link between the type of rental tenure and market efficiency. However, there is no logical reason to make a case for the provision of more social housing whose market is more purpose efficient with regard to residential environment under similar regulatory mechanism. This creates a knowledge gap about what is known of the residential market and raises question on hypothetical feelings toward eradication of negative externality in the informal residential market. The next chapter draws from the inefficiency of the Nigerian residential property market to present an elaborate discussion on the concept of Negative externality.

Chapter 4
Negative Externalities

4.1 Introduction

Chapter three presents a review on the Nigeria property market. Conceptualised from purpose efficiency perspective, it is found to be inefficient due to widespread negative externality, which is typical of the private rental housing market. This chapter is written with the specific aim of examining the possible solutions to negative externality from theoretical and empirical context. The intention is to discover the adequacy of the remedies available to victims of a negative externality on residential property. The chapter is structured into five focused sections. Section 4.2 examines the concept of negative externalities with a specific reference to grave as a source of externality on residential property. Section 4.3 presents a review of the key theorems of neoclassical welfare economics that are crucial to the study of externality. It reviews the Coasean and Piguovian taxation theories and the major criticisms of both approaches to negative externalities. Drawing from the criticisms on the neo-classical economics approach to negative externalities, section 4.4 extends the debate by providing a discussion on social welfare approach to solving negative externalities with specific focus on planning ideology. The last section presents a capstone on the chapter.

4.2 Concept of Negative Externalities

A critique of literature on the property market in chapter four shows that market failure is a major cause of negative externalities. Attempt to study this phenomenon notably started with the works of Marshal in the 20th century (1885), which was later expanded by Pigou (1920) and popularized by Coase (1935). From a common standpoint of the various definitions of negative externality, there is a consensus that a negative externality occurs when the action of an economic agent results in an adverse effect on another who neither consented to it nor compensated for the effect. The initial context of this term was restricted to industrial pollution. However, the concept of negative externalities has gained currency for indicating a collection of an endless list of environmental issues affecting people. These include noise pollution,

natural and technological risks, toxic waste, deprivation of any stable and criterion of inclusion, extinction of species and exhaustion of natural resources (Centemeri, 2007). The creator of this effect naturally enjoys the social benefits of the activities and passes substantial portion of the social cost to the other people. Consequently, it establishes a prima-facie case of market failure in resources allocation. Johnston (2012), notes that a negative externality can also occur when the parties involve are in contractual arrangement, this always gives rise to greater controversy. This is premised on the argument that victims of the effect are aware that their interests are well protected in a lease agreement before signing the contract. Hence, the affected party may uphold this as a breach of agreement and might resort to Nimbyism or seek legal action for remediation and specific performance of the terms of the contract.

4.2.1 Grave as a Source of Negative Externalities

By intellectual convergence, it is factual that every activity of man produces wastes that must be safely disposed to prevent spillover effect on others. Similarly, man himself becomes a waste that must be safely disposed when he passes away. Conventionally, a grave is the traditional method adopted for the safe disposal of human remains. One of the popular euphemisms Africans employ to describe a grave is that:

Grave is a final resting place, imagined as sacred and will remain unchanged and well-tended over the generations (Kay 1998, p.124).

The use of land for graves is confined to the graveyard; such land use is classified under service land. A graveyard is normally located in the peripheral area of the urban centres. Land use for such purpose is not economically viable, but it's considered appropriate for essential social welfare services. In a capitalist economy where land use is market driven, allocation for social services attract inadequate attention (Jones, 2014). According to CLG (2009, cited in Jones, 2014) land use in the cities for essential social services will not be provided for by the market but are normally promoted and protected by planning. Where the planning fails to give adequate allowance for graveyards, people are bound to explore the use of their residential property for a grave. Although, cremation is another available option for

safe disposal of human remains, the adoption of this practice is largely restricted to Europe and America and certain countries such as India and Nepal in Asia. For instance in the US, the adoption of cremation grew from 4 percent in the 1980 to 39 percent in 2010; this is expected to be as high 60 percent in 2025 (Zaslow, 2010). In Nigeria, the option of graves for the dead is largely scripted by religion. Hence, as the majority of the population either belong to one fate or the other, cremation is not an option for both Christians and Islamic fateful. Here are some popular views from a review of social discourse on the choice of disposal of human remains:

> *Once the important software "life" has escaped the body, I belief in burial of the remains because my religion says so. Based on my cultural affiliation "Yoruba", burial is more respectful while cremation is disrespectful to the body and the soul of the dead. Burning the body? why?* (Donroxy, 2012)

> *The traditional culture does not approve cremation; the natural process is the decomposition and recycling of matter from the earth* (Ptolomeus 2012).

Despite this opinion, a bill that legalises cremation was recently passed into law in July 2013 in Lagos after a tough parliamentary tussle; however, this is meant for the disposal of unclaimed human remains in the State's morgue and anybody who prefers such option. Excerpts from reactions on a social media to the passage of the bill are provided below on.

> *Personally, I don't believe in cremation, even if legalised, it will have its stigma. In Nigeria, most people look forward to a conventional burial in which they are laid to rest peacefully and their body allowed to decompose naturally. In Igbo culture, a man's body is laid to rest ceremoniously so that he may be allowed to join the ranks of his ancestors. If man is cremated, he cannot be buried and as a result cannot enter the afterlife* (Odumchi 2012).

According to a cleric,

> *the law is against our culture and tradition. Everybody has a choice of burial. My children cannot cremate me and nobody can compel me to be cremated. Cremation is English and it is not in the Bible, it is a type of*

culture where people write their will to be cremated when they died (Ola Makinde 2013).

It is a matter of choice and I know no right thinking Nigerians would cremate their beloved one. (Onwe, 2012).

The adoption of this method has been heavily criticised by public members who see it as an injustice and a social exclusion for unidentified dead who deserves a final resting place. In the study area, land use is market driven and service land is largely disregarded (See Figure 3.1 for analysis of land uses in Akure). From environmental conservation stance, grave itself is an acceptable measure adopted for safe disposal of human remains. However, the emerging issues are that, irrespective of the wider acceptability of a grave relative to other methods of disposing human remains, it may constitute a negative externality to the people if located within a residential property. Against this backdrop, section 4.3 and 4.4 examine neoclassical economics and social welfare approach to negative externality.

4.3 Key Theorems in Neoclassical Approach to Negative Externalities

The neoclassical economics approach to indemnify against negative externalities is as old as the concept itself. The various attempts made by neoclassical economists are conceptualised from welfare economics perspectives. Neo-classical economists posit that the assumption of these ideas would eliminate social cost imposed by negative externalities on the affected party. They are discussed in subsections 4.3.1 to 4.3.3.

4.3.1 Property Rights, Maximum Financial Compensation and the Coasean Theory

Coase (1937) is in the league of foremost scholars who touched upon negative externality and whose works led to the emergence of economics of law theorem. Largely, his idea to handling negative externalities tends to be in line with Pigo's however with a minor difference. Coase de-emphasizes government intervention to solving negative externalities between economic agents and argues that efficiency can be achieved with bargaining. In his theorem popularly known as Coasean

theorem, he advanced that “with a clearly defined and enforceable property rights as well as low transaction costs negative externality can be eliminated without government intervention. Coase argues that a polluter may bargain to buy the right of the victim of negative externality.

Coase work has been heavily criticised by several scholars. With many objections to Coase theorem in reality, Canterbury and Marvasti (1992), argue that the theorem is surrounded by many epicycles that render it circular. Their pessimism about redressing externality stems from transaction costs as a "second order effect" that cannot be internalised. They perceived that the application of this theory may be obviated and leads to persistent negative externality if transaction costs are too high to reach a paretian solution. The transaction costs may be too high or excessive. They concluded that the theorem's optimism is derived from the allocation of legal rights through mutual bargaining in a perfectly competitive market in which transaction costs are zero or very low.

According to Cheshire and Vermeulen (2008), the attainment of efficiency in resource allocation by this theory takes the distribution of real income as given and relegates the ideal distribution to a matter of individual judgement and conscience. They argue that despite the immense contribution of economic theory to distributional outcomes of planning interventions, housing affordability, its contribution to the desirability intention of such policies is de-emphasized. To Cheshire and Vermeulen, (2008), Coase welfare economics approach to negative externalities is an old-fashioned thought from a different intellectual tradition. However, a planning approach to negative externalities is rooted in design and engineering and it aspirations are utopian.

Although his theorem may work well among firms, applying this theorem may not work in all situations. For instance, in a situation where a tenant affected by a negative externality insists on specific performance of a landlord's responsibility of the provision of a good residential environment as contained in tenancy agreement, the theorem may fail.

4.3.2 Marshall's Theory of Public Goods to Solving Negative Externalities

The emergence of discussion on issues in externality is traceable to the pioneering work of Marshall (1890) on industrial pollution and depletion of the green belt. With his idea of welfare economics, Marshal advances a view that recognizes housing, environmental qualities as public goods that affect the quality of life. His social concern for any land use implications and deep conviction of the impact of welfare on the quality of life was explicitly expressed. This explains his support for the Garden city movement and development of industrial villages, which was aimed at providing quality of life by restricting negative externalities of industrial pollution (Caldari and Masini, 2011). Beside the initial context of his work, which is directly linked with negative externalities from industries, Caldari (2006) notes Marshall's unique pervasive concern for the social dimension of any action either economic or otherwise from both private and collective decision. With this concern at heart, Marshal argues for government intervention by the imposition of a fair "fresh air rate" on rent rather than industries arguing for coherence betterment process with every social and economic activities considered for its social effect.

4.3.3 Social Cost Internalisation and the Piguovian Taxation Theorem

Marshall's view on government intervention in the property market is consistent with Pigou (1912 and 1920) who literally took the idea of negative externalities to a wider context. Advancing the initial study by Marshal (1885) in what is popular known as the Pigouvian theory, Pigou clearly argues for the imposition of tax on polluters particularly when the private marginal net product is bigger than the social marginal product. Interestingly, both Marshal and Pigou worked extensively on welfare economics but noted with a common stance that the study of welfare as a whole transcends what can be brought into money measure. Pigou (1935) particularly noted that public intervention might be inevitable through bounty and tax to carve a social benefit if the government could be trusted to apply them rightly. A recent evaluation of Pigou's proposition of fiscal measure to mitigate negative externalities by Caldari and Masini (2011) holds that the measure is theoretically conceived. They argue that, Pigou never goes deep into practical matters, noting in part his failure to consider the viability of his theoretical conception on reality. For instance, Pigou did not refer to the impact of graduation of tax on welfare when

employed to present a report by Royal Commission of Income. They conclude by noting that for Pigou, a negative externality ideology is a mere departure from the ideal condition of perfect market, which could be restored by mere fiscal measure. This challenges the realisation of social benefit by applying this measure to internalise cost of external effect by polluters. This is especially so where the negative externality is caused by other landlords apart from the industries. In an extreme situation where a producer of a negative externality is able to afford the ex-ante and ex-post tax, social welfare and sustainable development would be sacrificed for private marginal benefit.

From the foregoing critique of the theorems of negative externalities, it is evident that widely recognizes foremost (Coase; Piguo and Marshal) scholars of negative externality share some common stance on the imposition of tax on polluters. Marshall tends to be more flexible in his approach. A critical evaluation of both Marshal and Pigou stance leave so much to be desired for universal application of fiscal measure to curb negative externalities of all types. Concerning the negative externalities of graves in this study, a rational question to be asked is that; why should a fiscal measure be applied to allow the location of graves in homes when there are designated areas meant for such purpose? Similarly, should the quality of residential environment be sacrificed for the revenue purpose when planning and environmental laws could be enforced to control property rights and negative externality? Further, the maximum carrying capacity of any plot of residential land could be argued. If negative externalities were continually compromised based on internalisation of social cost by the polluters, residential plots would be stressed beyond limits. Consequently, such properties may become socially undesirable to potential tenants as functional obsolescence sets in. This argument opens up a critique of the relevance of neoclassical approach to negative externalities in the next subsection.

4.3.4 Criticisms of the Neoclassical Economics Approach to Negative Externality

Most neoclassical economists' opinions on externalities are founded on market as the best way of resolving externality. This ideal tends to build independent economic sphere and disregard the political sphere and importance of the human environment (Centemeri 2007). According to Luzzatti (2005), the theory of neoclassical

economics tends to be intrinsically indifferent to a process that assures the reproduction of environmental and material conditions, which guarantee the existence of human being. Neoclassical economic theory proposed such tools as taxation, regulations, property rights attribution of resources for internalisation of cost. They present the problem of externality as basic failure of scarce resources allocation; hence, internalisation of cost is resolving issues of cost-benefit analysis applied to pollution and de-pollution. According to Centemeri (2007), the idea of internalisation of cost trivialises the complex nature of environmental issues and raises a many criticisms from other researchers. Two obvious gaps from this approach are highlighted (*ibid*).

Firstly, the redistributive effects embedded in the model are disregarded. He stressed that the issues of equity linked to the environment is neglected in the model. Vallee (2002) supports this view by his observation of unequal allotment of cost and benefits among different individuals, social categories, present and future generations not considered in the internalisation process. As noted from various, researchers, such as Gurrad (2003) and Centemeri (2007), the most important argument noticed by neoclassical contribution is the efficiency in the distribution of scarce resources. They argue that there are social goals at stakes, affecting the best approach to deal with negative externalities in the residential environment.

Secondly, the principles of economic marginal analysis as proposed cannot be usefully applied to complex systems in reality. A marginal increase in the effect of a negative externality may not always lead to corresponding marginal injury to the parties affected *(ibid)*. There may be a tipping point beyond which the environment can no longer absorb further pollutant; hence, irreversible damage would be inflicted on the environment (Sagoff, 1981).

Johnston (2012) also noted that since the pioneering work of Ronald Coase, economists have argued that negative externalities should be dealt with either by regulation or mutual bargaining between the parties involved. He argues that neither of these panaceas offers a sufficient way of dealing with externalities. A negative externality is characterised by a factually and technologically complex chain of causation. He argues in part that instrumental regulation faces massive difficulties in dealing with externality. Consequently, many cases of negative externalities are not

corrected because parties cannot reach a compromise on the transaction costs. There are other barriers to bargaining outside the broadest notion of transaction cost, which calls for an alternative approach to handling negative externalities *(ibid)*. He therefore argues that this gap could be filled with corporate social responsibility (CSR), with specific relevance to industries.

Kapp (1969), also criticises the neo-classical approach to negative externalities. He argues that this analytical device cannot satisfy those who disagree with traditional economic analysis. The existence of social cost is an indication of that cumulative dynamic interdependence between economic units. This raises serious doubt as to the validity and purpose of some of the most essential assumptions of economic theory. Extending this argument, he notes that if economic units with unequal power are able to shift part of their costs to others, market costs and prices must be regarded as more or less arbitrary and indeed unreliable measures of economic rationality. Hence, it becomes necessary not only for the purpose of evaluation and measuring social cost, but for the determination of priorities to elaborate a theory of social value in the sense of value to society based upon objective, that is, empirically ascertained criteria for what is necessary and essential for human life and survival (Kapp, 1969).

Similarly, Steinacker (2006) notes the elaborate contributions of economist and policy analysts on the menace of negative externalities and possible solutions; however, he notes an important missing gap. Most of the arguments fail to acknowledge problem definition and that the proffered solutions are contingent on people's' acceptance. With a lack of local content, he observes that the political theory of agenda setting and policy choice are still limited in predicting when an issue becomes salient, and once it has, what policy option to be adopted. While the assignment of property rights provides for further government intervention when losses are established, he discovered that a bias always occur in favour of the polluter. For a large externality problem, Steinacker (2006) argues that perspectives from three social science discipline should be applied to refine prediction of losses.

- Firstly, he advises a thorough synthesis of the implication from economics assignment of property rights.
- Secondly, the psychological behaviour of the people to choice under uncertainty should be conceptualised from loss aversion and prospect theory.

- Thirdly, the image of the policy meant to prevent negative externalities should be conceptualised from social construction. With this concept at the baseline, the condition under which a negative externality gains attention and the possible policy measure would be correctly determined.

4.4 Social Welfare Approach to Negative Externalities

With reference to normative economics stance, Smith (1776) claims that the efficient allocation of land and other resources can only be achieved in the market. However, empirical evidence from real market situation proved that this is not true in an unregulated market condition. Findings from Cheshire and Sheppard (2002), Cheshire and Vermeulen (2009), Caldari and Masini (2011) and Cheshire (2013) all reveal market failure in resource allocation that protect socio-economic welfare of the populace in the market. Cheshire (2013) noted that unregulated property market normally suffers from endemic market failure due to locational fixity of property, use and the attributes of adjoining properties. In a similar study carried out by Cheshire and Vermeulen (2009), they argue that land and housing market are riddled with negative externalities, particularly those caused by the activities of landlords. Given the reality of inefficiency in the property market, current global interventions in property market suggest that no nation can be indifferent to the use of land and housing rights in its domain. According to Cheshire and Vermeulen (2009), the adoption of welfare economics in government intervention in the property market is founded on two fundamental theorems. One of the theorems is relevant to this discussion. The theorem states that certain regulation such as development control and planning could provide efficient market functions that are socially optimal and devoid of negative externality. Market can only achieve social optimality in allocation and right of use if no one is made worse-off in welfare terms than they previously were *(ibid)*. The validity of this theorem depends on four major conditions:

- People are the best judge of their welfare;
- Property owners' activities have no influence on tenants and adjoining property owners' welfare without being compensated;

- Consumers are open to choices and no agent in the system has a degree of monopoly; and
- All goods have prices.

Any violation of one of the condition would lead to failure in the property market (Cheshire and Vermeulen, 2008).

4.4.1 Brief History of Planning as a Social Welfare Approach to the Property Market

The current development in the 21st century globally reveals an emergent of complexity of rights, restrictions and responsibilities over land. This awakes consciousness to land use and administration with a focus on social welfare, and environmental benefits as opposed to a more traditional focus on economic benefits in most developing countries. Conversely, the land use planning system in most cities in the United Kingdom offers a nearly utopian and interesting perspective. It remains the principal mechanism for mediating social interest in the allocation, use, control and development of land. Ratcliff et al. (2009) noted that urban planning in the UK is a post war invention traceable to the Garden city movement at the turn of the twentieth century and the enactment of the Town and Country Planning Act of 1947. Howard (1898) argued that the development of the Garden city was predicated on the need to avoid perceived negative externalities resulting from land uses in the squalor of Victorian City.

Three major principles of the UK Town and Country Planning legislation upon which the Garden city was founded are relevant to this research. First, there is finite limit to land use, secondly, there is a pre-established pattern of real estate development and lastly, all land is under municipal control. One consistent factor throughout the examination of the UK urban history is that the society affords a measure of regulatory control to the state in land use supervision (Ratcliff, et al., 2007). Peel and Lloyd (2007) emphasize that the land use planning system finds itself directly at the interface between State market interests with such a complex link, coloured by competing social construction of public interest. This is typified by a clear demarcation between asserted developmental and environmental conservation

ambitions, which argue for different outcomes from the planning regulatory framework in the United Kingdom.

The Scottish Executive (2005) noted that recently in the UK, there is commitment to enhance public participation in the land use planning and administration; thus provoking opportunities for more construction, debate, engagement and dialogue in determining land use and development policy outcomes. This graduation in planning is quite a dynamic participatory system involving a bottom top approach contrary to top bottom approach in many developing countries where end users of planning product are seen as object and not subject of the plan. As in many developed parts of world, the UK 1947 Town and Country Planning law nationalized the rights of private individual to develop land. This is achieved by stipulating that planning permission is required for certain development to secure the interest of the community in order to avoid negative externalities (on man as well as flora and fauna in the community) that can potentially harm amenity.

4.4.2 Planning; a Social Welfare Approach to Negative Externalities

Unlike the neoclassical economics approach to negative externalities, planning is a value driven activity not applied with a neutral ideology but with a normative philosophy (Jones, 2014). Planning is a contemporary measure of regulating market impact on the use and allocation of land among competing human needs. Its objective can be achieved by zoning and other planning regulations. With planning, landlords are neither always allowed to build what they wanted where they wanted it, nor use their property in ways that they wanted it (Hartman & Needham, 2012). According to Ely (1992) and Epsetein (2008) critics view planning as one way by which the regulatory power of government infringes on private property rights. This view is consistent with Harvey and Paulsen's (2009) findings among critics of property market regulation in America. They note that American property rights mounted a systematic attack on land use planning as Landlords argue in part that planning seeks to impose elite values on all groups, which is out of step with core American values. Such a simplistic critique against land use planning ignores the utopian distribution of property and welfare economic interest involved in public land use planning *(ibid).*

Irrespective of the criticisms against property market, zoning regulation is central to sustainable city as it helps to separate and isolate potential uses that could lead to negative externalities. This is justified by empirical evidences from a large body of studies evaluating the benefits and costs of market regulation. For instance, Cheshire and Sheppard's (2002) findings reveal that the welfare effect of zoning regulation in the UK is large. It isolates land uses that can generate negative external effects and help to guarantee the provision of good neighbourhood quality and amenities such as open spaces service land. Jones (2014) notes that planning does not only regulate the property market; it shapes and stimulates it. He advances a strong case for planning irrespective of the theory inclination (neoclassical and transaction cost theory). He argues that the major debates about planning are not planning regulation per se, but policies where theory has little to say. Planning is usually driven by values and social goals often determined by a government political complexion. Planning agenda in most nations primarily focused on the institutional process of meeting public interest and utopian ideal of which sustainable development is the latest manifestation *(ibid).*

The potential impact of planning on property market has been widely discussed at micro and macro levels in the literature (see Adam and Tiesdell 2010). At the macro level, the impact of spatial planning on the national economic performance cannot be de-emphasized. The redistributive impact of planning policies impact is mainly concerned about how it affects land and property by restraining supply. On the other hand, the impact of planning on the property market is crucial to individual's decision to invest by way of lease and outright purchase. As a risk reduction mechanism, Adam and Tiesdell (2010) argue that planning serves to shape, regulate and stimulate market.

Despite the potential impact of planning at the macro and micro levels, much literature has observed a disconnect between planning and the operation of the property market (see Antwi and Adam 2003, Adam and Tiesdell 2010; Mabogunje 2010 and Jones 2014). The achievement of this aspiration is thwarted by rapid political upheavals and inadequate human expertise. From an empirical experience of the impact of market forces on the location of retail shops in the UK, Jones (2014) conclude that market forces do limit routes to utopian aspiration of planning. He advances that planners need the motivation, understanding and means to control the formal and informal property market to produce the desired outcomes. In order to

enhance socially constructive nature of the market, researchers argue for active engagement with the market. Without this, planning may remain inept and slip into market-led mode of thinking (Adam & Tiesdell 2010).

In order to secure maximum practicable economy, convenience and beauty which are potential deliverables of planning, Keeble (1961) considers the major barrier that undermine the saliency of planning objective. Noting the inextricable link between urban planning and implementation, he argues that;

Nothing will be done to achieve planning objectives unless some persons (private, individual and public) are able and willing to carry out the development proposed (Keeble, 1961).

He stressed that the success of the restrictive aspect of planning designed to prevent intrusion of inappropriate uses in a particular area, depends on the ability and willingness of planning authorities to carry out the day to day control of development effectively. In the same vein, UN (2008) drew a corroborating inference from its study of land registration in Ethiopia and concluded that;

laws without enforcement will not help much when there are strong traditional land use practices against them.

This vacuum is the situation in developing countries where urban land use structure is characterized by conflicting uses with flagrant disregard of existing planning policy. Dowall (1996) took a global view of the troubling evidences of inefficient planning in urban areas with its notable adverse impact on social welfare and economic productivity in the informal areas of cities. He argues that in the mind of policy makers, achievement of land policy objectives requires stronger medicine with emphasis on land nationalisation as a possible way out. However, in his opinion, he notes that while land nationalisation can encourage the growth of formal market, government intervention in the property market cannot be de-emphasised in guiding against negative externality. Bearing this in mind, he proposed that each government should strike a balance between the public and private sector regarding urban land use and management.

4.5 Conclusion

This chapter presents a review on negative externality with the aim of examining the possible way of dealing with it. It starts with a discussion on the concept of externality and a social discourse on grave as a source of negative externalities on residential property. Both neo-classical and welfare economics approaches to negative externality are explored. While neoclassical economics approach to solving negative externalities is the foremost approach, its applicability to all cases is quite limited. Particularly, if the loss resulting from a negative externality is not socially desirable, compromising welfare for financial compensation to an affected party is counter-productive. From social welfare point of view, planning would be more beneficial as it considers a symbiotic use of residential property that considers human environment and co-exists with it.

Chapter 5
Application of Revealed and Stated Preference Approaches to Impacted Residential Property

5.1 Introduction

The last chapter discusses the concept of negative externality as a common outcome of inefficient residential property market. This chapter presents a critique on the empirical applications of RP and SP approaches to negative externality on residential property. The aim is to examine the various methods and their consistencies in assessing the economic impact of negative externalities. On this note, the chapter presents a critique on some of the existing literature on negative externalities with a view to determining their influence on residential property value and choices. The chapter comprises of eight sections. Section 5.2 presents a review on the assessment of negative externalities using RP data. Section 5.3 presents a review of literature that assessed the impact of negative externalities using SP data. Section 5.4 discusses choice modelling, with a focus on choice experiment and its application to impacted residential properties. In section 5.5, the study provides a highlight of the identified gap in the existing literature. Section 5.6 provides a discussion on the conceptual framework for the research while section 5.7 dwells on specification of model for the household choice and estimation process. It starts with a debate on the economic theory underlying non-market valuation. The last section reflects on the various sections to draw a conclusion on the chapter.

5.2 Overview of Revealed Preference (RP) Approach

The last few decades have experienced a large volume of publications that examine the impact of environmental factors and land use externalities on real estate market. Most of them focus on the extent to which negative externalities are capitalized into real estate value. Most of these studies have been largely restricted to sales value while similar studies on renter value are quite limited. A majority of the studies were carried out in the developed world where adequate records of property data are available. Many of the studies adopted RP particularly using hedonic pricing model. (see Boyle and Kiel 2001; Jackson (2001); Jackson (2002); Bradford et al. (2006);

Longo and Alberini (2006). According to Pearce et al. (2004) RP approach to valuation of non-market goods simply employs individuals' preferences from actual market to uncover economic value. The hedonic pricing (HP) model is the most popular RP method commonly used to measure the economic impact of negative externalities on residential property. The next session discusses the application of the HP on selected cases of negative externalities on residential real estate.

5.2.1 Application of HP to Negative Externalities in Residential Properties

Literature is replete with an unending list of research works, which applied HP model to estimate economic value of many types of negative externalities such as such water pollution, soil pollution, air quality and the like. Bolitzer and Netusil (2000) carried out one of the closet investigations on the impact of negative externalities considered in this study. The study investigates the impact of open spaces namely: cemetery, public-park, private park and golf course on residential property values in Oregon and Portland. Based on the observation that nearness to an open space would nonlinearly influence marginal implicit price (because of positive and negative externalities from residing near open space), they classified the distance from a home to the nearest open space into six zones. They also constructed similar variables to investigate possible variance on the impact of cemetery and other types of open spaces. This was achieved by holding other variables constant, and testing whether for instance, proximity to cemetery has a similar impact on value as proximity to for instance, private park. Parameter estimates derived from linear and semi-log model reveal that the cemetery has no statistical significant effects on residential properties' sale value (Bolitzer and Netusil, 2000).

Similarly, Larsen and Coleman (2010) applied the HP model to investigate the impact of cemeteries on residential property value in Portland. The study attempted to overcome the perceived shortcoming of Bolitzer and Netusil (2000) research. Rather than categorising cemeteries into groups, which tends to obviate the diminution impact on property value in the previous study, Larsen and Coleman (2010) embarked on separate analyses of the impact of each cemetery on surrounding residential property value. They improved upon the study by investigating the loss in property value from certain distances to the cemetery, arguing that some of the negative and positive externalities depend on the visibility

of a cemetery from residential properties. Bourassa et al. (2004) support this argument in the outcome of meta-analysis of 35 studies that investigated the effects of views on residential property values. Although some variations were noticed in the conclusion of the various studies, a very large amount of the works significantly report that views have an impact on the sales price of residential homes. Based on this precedent, Larsen and Coleman (2010) collected historic sales data from 575 transactions in single-family houses in the neighbourhood of the cemeteries using view and distance between homes and cemetery as major yardsticks. Joint analyses of variables from the four cemeteries reveal that neither view nor distance has a significant negative effect on property values. However, a separate investigation of each cemetery using HP model produced different results. In two instances, a cemetery's view has no significant relationship with sales' value. The third cemetery shows that cemetery's view significantly added to home value with an average amount of about 8.8 percent of the mean house price. Conversely, the fourth cemetery shows that cemetery view is associated with a diminution in value to an amount equal to 10.1 percent of mean house price.

The study produced no definite direction on the impact of externality (negative or positive) generated by the proximity of cemeteries to residential properties. However, Larsen and Coleman (2010) highlight some issues (costs and benefits) concerning the Willingness to pay for a property in close proximity to cemetery that rule out the reliability of a general comments on its social costs. For instance, some of the potential social cost of the location of a cemetery on nearby homes includes the fact that cemetery visitors, mourners and trespassers may create noises with economic value, which may regularly disturb nearby homeowners. In addition, a cemetery's view may be compromised if they are not maintained or suffer vandalization. Residents in the vicinity are vulnerable to potential physical damage and health risk *(ibid).* Spongberg and Beck (2000) support this claim with a finding that cemeteries contain hazardous chemical and metallic substance, which may be released to neighbouring groundwater. On the other hand, from the positive externality point of view, compared to the risk of facing busy traffic on the road, cemetery offers a safe place to walk, jog exercise, and engage in other outdoor recreation. A view of relatively open vista that includes some tombstone may be

preferred to the one restricted to neighbours house or garage (Larsen and Coleman, 2010).

In a slightly different context from the works of Larsen and Coleman (2010), Bolitzer and Netusil (2000) and Agee and Crocker (2010) investigate the impact of environmental shock from new crematory operations on adjacent residential property values in Rawlins and Wyoming in the United States. The study applied HP model to analyse a set of data, which include sales prices, neighbourhood and structural characteristics, distances from crematorium and the atmospheric emissions from the crematorium. The findings from the study show that proximity to the crematorium measured in both direction and distance has statistically significant reduction in property value A loss of between 0.3 to 3.6 percent of average sale price was recorded for every one-tenth mile near to the crematory.

Simon et al. (2001) investigated the effect of environmental impact of oil pipeline rupture on residential property value in Maryland. With an evidence of actual sale data collected from 2,300 single-family house sales before and after the spill, the result shows a WTP of less than 10 percent less than the open market value of un-impacted property located in the interior of the oil community. For residential property located at the waterfront, a sharp decrease in the sale value was recorded; however, there were not enough sales data to the statistical significance at 90 percent confidence level. Winkle and Gordon (2013) carried out a similar study with broader objectives. The study investigates the impact of oil spill on the volume of sale and willingness to pay for impacted condominium houses located along the Gulf coast of Alabama. Using HP model on actual sales data, findings reveal that property sale value decreases by 8.8 percent while the volume of sale decreases by 50 percent within 6 months of the spillage.

Also, Kim and Goldsmith (2008) adopted the HP model to investigate the impact of confined animal feeding operations (CAFO) on residential property values using a collection of assessed property values and sales price in North Carolina. The study took account of spatial dependence in property value and discovered an average reduction of 18% in WTP for residential properties impacted within the locality.

Mihaescu and Hofe (2012) examine the negative impact of a Brownfield site on single-family residential property value in Cincinnati. The sites include abandoned

and under-used sites formerly used for industrial activities. These sites are known to be somewhat contaminated, thereby complicating further redevelopment. Using three different HP models, properties that are located less than 1000 feet from a Brownfield site experience significant loss in value. The WTP show a reduction of between 19.96 to 21.93 percent in the value of residential properties that are adjacent to the source of the Brownfield sites.

De vor and Groot (2009) investigate the impact of industrial site in Randstad region in the Netherlands on nearby residential properties. The study collected and analysed actual sales data to assess loss in welfare and its concomitant effect on property value. The findings show that a property that is located within 250 metres from the industrial in loses an average of 14.9 percent in property value.

Hamilton and Schwann (1995) applied the HP model to estimate the impact of high voltage power lines (HVTL) on nearby residential properties from four residential districts in Canada. Using actual data from home sale between 1985 and1991, the study records a significant loss of about 6.30 percent in value. Conversely, a similar empirical study carried out by Chalmers & Voorvaart (2009) show that the proximity and visibility variables of a HVTL have no statistically significant impact on nearby property value in England. In a similar fashion, Wolverton and Bottemiller (2003) applied the HP model to confirm the effect of HVTL on property Value in Oregon, Vancouver and Seattle. Using a more statistically robust analysis, the findings shows that HVTL right -of -way has no significant effect on residential properties abutting it. Their finding confirm previous empirical studies by Cowger et al. (1996) that employs less rigorous statistics "pair comparison" to examine the effect HVTL on property sales' value.

5.2.2 Anecdotal Report of Actual Sale Value on Impacted Property

Pitts and Jackson (2007) conducted an interview on Realtors who have evidence of actual sale price on residential properties abutting and un-abutting HVTL. A realtor in Oakley confirms that HVTLs has no effect on the selling price of a property abutting it in many areas in California. Other realtors interviewed confirm that an average of between 2 and 7 percent is lost in the value of a property abutting HVTL. Similarly, depending on the views and proximity to lines, an average price impact of

between 0 and 5 percent are estimated to be lost in the value of a property not directly abutting it. Largely, the interviewees claimed that the market condition at the time of sale is a major determinant of loss (Pitts & Jackson, 2007). According to one of the realtors, the effect of negative externalities is evident in a slow market but diminishes in a market with strong demand *(ibid)*

5.3 Application of Stated Preference (SP) to Negative Externalities

This section presents a review of the application of SP approach to negative externality in residential property (See detail description of the SP method in section 8.2). It dwells on examples from CV and choice modelling (with specific examples on choice experiment).

5.3.1 Historical Overview of the (SP) Method

The SP approach uses hypothetical behavioural choice data to estimate potential values where there is lack of historic data (Pearce et al. 2002, and Bateman et al. 2002). It relies on respondents' feedback on predesigned choice sets to offer a hypothetical market, and it is useful to forecast future demand. The origin of this SP approach is precisely unknown; however, it is traceable to works of researchers in the field of utility theory during the first half of the 21st century. The quest to determine the consumer's method of estimating utility for goods and services led to the emergence of the consumer preference approach (Abley, undated). The use of the SP method to assign economics values on non-market goods and services and negative externalities usually takes two major forms namely: contingent valuation and choice modelling. Subsection 8.2.1 and 8.2.2 discusses the two approaches to SP research method.

5.3.2 Contingent Valuation (CV) Approach

According to Mitchell and Carson (1989), CV is a direct survey approach to estimating consumer preference. It is well rooted in welfare economics and consistent with the consumer choice theory. It involves designing a contingent market with the aid of an appropriate questionnaire to describe the property and asking the respondents their maximum WTP or minimum WTA for a hypothetical

change in the level of provision of the good in question (Hanley et al. 2001). The most popular CV questions ask respondents what value they will ascribe to specific change in their environment as well as what they will be willing to pay to have it occur. In contrast to discrete choice questions, CV presents respondents with open-ended questions and asks them to state monetary values rather than responding to values offered by researchers (Bateman et al. 2002). This often leads to protest votes, which occur when the households are the direct beneficiaries of the financial benefits or against the survey. The second major CV approach involves asking discrete choice questions. It asks for a yes or no answer to the question, for example "Would you be willing to pay £X ?" The response to this question reveals individual upper bound (for a no) and lower bound (for a yes answer), however, it is susceptible to bias.

A careful review of the literature on the application of SP to real estate issues shows that a majority of the research on negative externalities (contamination and stigmatisation) apply the CV approach. This includes the studies carried out by Simons and Winson-Geideman (2005), Simon and Throupe (2005) Delaney and Timmons (1992), and the like. Despite the wide applications of the CV approach, the accuracy of its estimates in welfare measure (WTP and WTA) are surrounded by many criticisms. The advantages and the disadvantages of the CV approach to estimating WTP are presented below.

Advantages of Contingent Valuation

- The CV valuation method is quite flexible
- The method makes it easier to eliminate the troubles of estimation and interpretation introduced by confounding variables (Brookshire & Crocker, 1981).
- The answers are informative and statistically easy to analyse.

Disadvantages of Contingent Valuation Approach

- One of the major limitations of this approach is high incidence of protest bids resulting from associated cognitive burden and strategic biddings. According to Shavel (1991), an individual may have motives to misrepresent their

opinion and give answers that may reflect something different from valuation.

- Despite the application of dichotomous choice, the outcome appears to be significantly larger than open-ended values due to yes saying.
- The application of CV is not ideally suited to cases with multidimensional changes.
- In certain contexts, individuals need a great deal of data and scientific, economic or other specialised knowledge to be able to estimate the values of harms, which they are asked (Shavel 1991)

5.3.3 Applications of C V Approach to WTP for Negatively Impacted Residential Property

A careful search of the literature on the application of SP approach to real estate issues shows that a majority of the research on negative externalities (contamination and stigmatisation) were done by applying contingent valuation approach. For instance, Simons and Winson-Geideman (2005) applied the method to determine the impact of leaking underground storage tank on residential values in eight states in the United States of America. Specifically, they applied contingent valuation approach using bidding technique to assess WTP of a selected sample from a list of potential homeowners gotten from records of registered voters in different counties. The study reveals a consistent negative discount between 25 and 33 percent among marginal bidders across the states. In addition, the bidding pattern shows possible impact of income effects and awareness of contamination on value, as a validity test for WTP among respondents with high income and those aware of contamination show less likelihood to bidding. The implication of this scenario is a loss in property value and high level of property abandonment due to stigmatisation. Conversely, households without high school degree were more likely to bid

Delaney and Timmons (1992) applied contingent valuation method to appraise the impact of HVTL high voltage power lines on residential property values in forty-seven states including Puerto- Rico in the US. Questionnaires were administered to a randomly selected 500 respondents. Respondents' utility decision (*wantability*) revealed that they are willing to pay an average of 10.01% lower than the realistic open market value of similar properties not in close proximity to high voltage power

line. The study reveals further possible diminution in residential values from many appraisers who were yet to appraise such negatively impacted properties.

Similarly, Simon and Throupe (2005) carried out a survey using contingent valuation to assess WTP for residential properties with mold contamination. They collected data from 195 randomly selected respondents in South Carolina. Findings reveal that that only 58 percent of potential homeowners having full information on the contamination would bid to buy. However, the bid figure would be ridiculously low to be considered by sellers. About 42 percent of the respondents show that they would not bid on the properties at all. Estimated loss on the properties is put at between 20 percent when few properties are affected and 37 percent when residential units are affected by toxic mold. They concluded that the accurate figure for a given mold contamination scenario depends on the market situation which also reflect post remediation stigma.

5.4 Choice Modelling

The choice modelling approach has been extensively applied to determine economic value when there is a betterment or deterioration in quality of the environment. It is functionally efficient as it avoids protest votes, which some respondents may create due to ethical objections to the notion of paying for certain non-market goods (Bateman et al. 2002). The method achieves this by avoiding information on direct monetary value, but relies on a statistical technique to infer WTP indirectly from choices, ranking or rating. The preference for choice modelling over contingent valuation for this research is because it does not allow respondents to think directly in money terms. As discussed in section 4.1, this approach measures economic values by assigning a money indicator as an attribute of each alternative (Bateman et al. 2002). The major types of methods under this approach include stated choice experiment, ranking, rating and paired comparison. Each of these methods differs in the degree of complexities, quality of information and ability to generate WTP estimates consistent with the usual measure of welfare change (see table 5.1, for a comparison of the choice modelling methods and their consistency with welfare economics).

Table 5.1: Advantages of Choice Modelling over other Stated Preference Methods

Approach	*Tasks*	*Estimates Consistent With Welfare Economics*
Choice Experiments	Choose between alternatives usually two alternatives, versus the status quo	yes
Contingent Ranking	Rank a series of alternatives	Depends
Contingent Rating	Score alternative scenarios on a scale of 1-10	Doubtful
Paired Comparisons	Score pairs of scenarios on similar scale	Doubtful
In order to interpret the result in standard welfare economic terms, one of the options must be currently feasible.		

Source: Pearce et al. (2000)

5.4.1 Stated Choice Experiment

Stated choice experiment is an attributes based approach, which presents respondents with a set of hypothetical alternatives and asking them to make their choice (Holmes & Adamowicz 2003 and Bateman et al 2002). This approach is useful where there is lack of sales data and in particular insufficient sales information on a negative externality (Simon and Winson-Geideman, 2005). According to Burnet and Blamey (2001), evolution of this approach is traceable to the response of marketing researchers to challenges faced by economists in the use of ranking and rating studies. It is the most attractive type of choice modelling approach from an economic point of view (Bateman et al. 2002). This approach was originally developed by Louviere and Hensher (1982) and Louviere and Woodworth (1983). It exhibits a similar theoretical framework with dichotomous-choice CV within a Random Utility Model (see Luce, 1959; McFadden, 1973), as well as a common basis of empirical analysis in limited dependent variable econometrics (Green, 1997). This approach to choice modelling is founded on the Lancaster's theory of value and Random Utility Theory (see subsection section 5.6.2 and section 5.7)

- Justification for Stated Choice Experimental Method

This study recognises the absence of actual arm's length rental evidence that capture the impact of a grave residential property. Hence, the adoption hedonic pricing model, which is the most popular method, is impracticable. This paved way for the application of SP approach, which captures the variable of interest. As shown in figure 8.1, the stated choice experiment method is the only choice modelling approach whose WTP estimate is always consistent with welfare economics. The location of graves on residential properties and their impacts provides the justifications for selecting choice experiment approach for this study. The grave's externality variable is logically defined by its context, sample selection requires that survey respondents are either residing in residential properties with graves or residing close to properties with graves. The residential scenarios presented to the respondents are already visible sights in the various neighbourhoods; therefore, the choice context is genuine and well known to the respondents.

5.4.2 Applications of Choice Experiment to Negative Externalities in Residential Property

Most of the studies carried out on economic valuation of negative externality in real estate research were largely based on the applications of CV and observed choices. However, there is a marked growing body of literature applying choice modelling in environmental economics, transport studies and marketing. This emphasizes the increasing role of the choice experiment in choice modelling and willingness to pay (Hoyos, 2010). Evidence in the literature shows that its' application for estimating the effect of positive externalities is more than negative externalities in residential property. Despite the criticisms against this approach, its application is becoming more popular in the assessment of the impact of negative externalities on real estate value. Some instances of the applications of this method to uncovering WTP and household choice in the residential property market are discussed below.

The study of Walker et al. (2002) is one of the foremost studies that apply choice experiment to model tenants' residential choice and WTP. The study investigates the potential housing choices of tenants in public housing estate with differential neighbourhood quality in Oxford. Tenants were asked to choose their preferred

housing option from stated choice questions comprising notional choices, such as a reduction in housing benefit in return for renting a property with a good neighbourhood and a rent discount for those who would choose otherwise. The findings show that most tenants are not willing to take advantage of discounted rent to move to housing estate considered worse in comparison to their current housing estate.

Sotiris et al. (2011) carried out a stated choice experiment study to assess the impact of noise externalities on home values in the field of transport studies. The study attempts to assess the value placed on noise annoyance by the residents of nearby housing to an airport in Athens. The study offered respondents with choices containing actual inter-temporal noise change. It also incorporates the presence or absence of an airport with a few transport attributes that accompany the airport's relocation. The outcome of the study revealed that homeowners are willing to pay €13.12 monthly to terminate aircraft noise in their vicinity. It also shows that homeowners are willing to pay €9.53 per monthly to avoid the occurrence of noise externality. In a similar fashion, Masurier et al (2008) carried out a study on the negative externalities of aircraft noise annoyance on homeowners living around airport sites in the UK. The stated choice experiment study produced a result that is consistent with Sotiris's (2011) study. Despite the inclusion of a possible grant to homeowners to cushion the effect of noise annoyance, the findings show that impacted homes are not preferred.

Guignet (2012) applied stated choice experiment to investigate how households value environmental quality in Maryland. Using Leaking underground storage tank (LUST) as the source of negative externality, a choice set scenario was designed and presented to the households to assess their environmental health risk and its effect on property values. The findings from the stated choice data collected reveal that households are willing to pay between 18 to 24 percent less than the open market value when such pollution occur in their neighbourhood. It further reveals that when a household's property is directly impacted by LUST, the loss in property value is well over 24 percent.

Danielis et al. (2009) apply stated choice experiment to collect data from a group of households in Italy, The study was conducted with the aim of investigating

households choice of residential location and the trade-off they would make between different environmental qualities namely; accessibility, air pollution and noise. Specific finding from the survey shows that the most important variable is absence of air pollution, followed by a good accessibility level and lastly a low noise level.

Banfi et al. (2007) worked on the impacts of non-ionizing radiation from antennas on residents and economic activities in two Swiss cities. The study was carried out with aim of providing useful information to policy-makers with possible benefits derivable by boosting environmental quality. The findings reveal that homeowners are willing to pay a significant amount to reduce the negative externalities of electro smug in the two cities.

Other applications of the stated choice experiment in residential housing market under negative externality can be found in the works of Michelsen and Madlener (2012), Rouvinen and Matero (2013) and Frenkel et al. (2013).

5.5 Literature Gap

The concept of negative externalities is wide and differs in many respects. It ranges from a mild externality to life threatening ones with perhaps unknown hazardous impact. The list of academic publications on WTP and residential choices are extensive. Many of the studies produced outcomes with mixed interpretations on the impact of negative externalities on residential value. None of the studies explored the externality of a grave on tenants' residential choice and WTP. Similarly, some of the studies applied a research methodology whose consistency with consumer theory is doubtful. Other studies are based on observed choice data with possible omission of the factors of interest in the historic value and anecdotal evidence. The closest studies to the research context were Larsen and Coleman (2002), Bolitzer and Netusil (2000) on cemetery and Agee and Crocker (2010) is study on the impact of crematorium residential property sales value. However, their focus was on buyers' choices and sales value. To date, there is no evidence of the impact of the negative externality of a grave on tenants' residential choices and WTP. Hence, this study seeks to fill the gap using a more rigorous research method.

5.6 Conceptual Framework

Conceptual framework is a visual or written product, one that "explains, either graphically or in narrative form, the main things to be studied; the key factors, concept, or variable and the presumed relationships among them (Miles & Huberman, 1994, p.18).

Reflecting on the critique of empirical assessment of the impact of negative externality on residential property and households' choices, this section presents the ideals, assumptions, expectations and theories affecting tenants' choices and WTP, which is fundamental to the research. The aim is to provide a synthesis of how households make their choices, which reflects WTP when faced with alternative residential properties characterized by desirable and undesirable attributes. The section is divided into six subsections. It starts with a discussion on the economic theory underlying non-market valuation in subsection 5.6.1 and 5.6.2. Subsection 5.6.3 and 5.6.4 dwells on residential choice making process residential location theory respectively. Subsection 5.6.5 discusses welfare measure with specific focus on willingness to pay (WTP) and willingness to accept (WTA).

5.6.1 Economic Theory Underlying Non Market Valuation

The underlying theory of economic valuation is predicated on neoclassical economic theory of consumer preference and choice (Farber et al. 2002). Utility values of goods and services are reflected in individual willingness to pay (WTP) to have these characteristics or what they are willing to accept to forgo them. Nonmarket goods has no value or price tag, however empirical evidences revealed that they possess economic values, measurable from preferences. Economic theory underlying valuation of nonmarket goods is founded on the individual's preference and choice, which are the major elements of consumer theory (Cerda, 2005 and Farber et al. 2002). Therefore, this section discusses the theory of non-market valuation from the perspective of basic modern microeconomic theory of consumer choice and demand. According to Green (1990), Lancaster (1991) and Aleskerov et al. (2007), consumers have their preferences and choices, which apparently determine the utility attached to certain goods. They support the assumption of utility maximisation theory, which states that every consumer is a rational being who seeks to maximize the utility

attached to his choice while operating within a budget constraint. This view is consistent with Bertini et al. (2012) theory of inferred sensitivity to quality differences; they note that consumers would pick the highest available quality of any good if prices were identical.

Despite the wide acceptability of the utility maximisation theory as the foundation of classical theory in microeconomics, it suffers some criticisms where there are exceptions to the rule. Simon (1982) has been a strong contender of this theory since 1950; he argued that individuals do not necessarily choose the best alternative in a choice set, but rather they choose alternatives considered satisfactory. According to Sen (cited in Aleskerov et al. 2007) the theory also suffer from another criticism that emerge from several thought experiments, which reveal that rational behaviour are not often based on utility maximisation. Other classic experiments carried out by psychologists show empirical evidences of the situations where utility maximisation paradigm is not followed in making choice (Kahneman and Tversky, 2000; Kahneman and Thaler 2006). The criticisms may be valid for a minority of cases where individuals' choices are not consistent with optimization theory of rationality under some cognitive bounds. Despite the criticisms, the theory provides a rational explanation for overwhelming number of welfare estimates particularly willingness to pay (WTP) and willingness to accept (WTA). Lancasterian theory of value and the random utility theory discussed in subsection 5.6.2 below support the utility maximization theory.

5.6.2 Lancasterian Theory of Value.

The theory states that the value derived from a good is not gotten directly from it, but from the different characteristics it possesses (Lancaster, 1966). Lancaster and Kelvin (1971) further expanded on the theory by reporting that consumers spend their money on goods that possess desirable characteristics. The implication of this theory is that consumer surplus may change in response to marginal or large change in quality of these characteristics and price. (see graphical illustration in Figure 5.1 below).

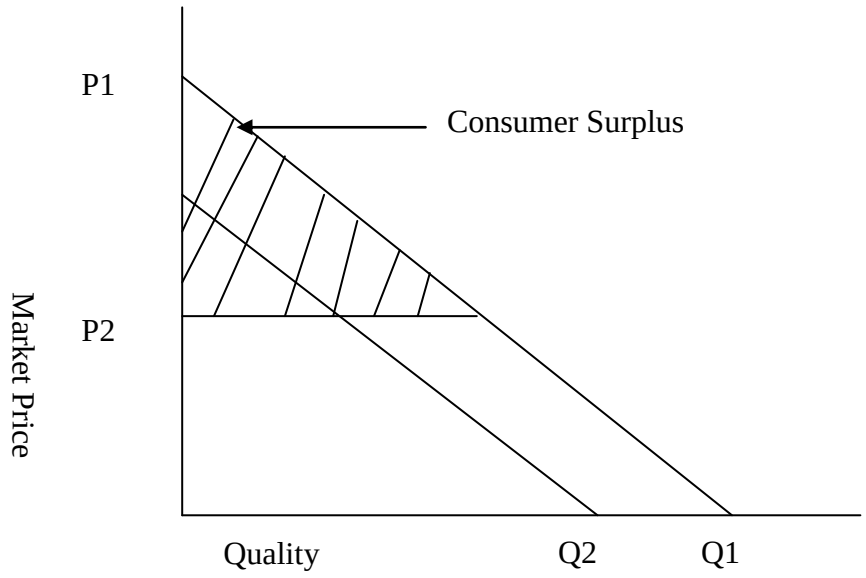


Figure 5.1: Consumer Surplus's Response to Change in Quality and Price

Lancaster (1991) reported that the motivation for developing a new way of approaching the relationship between consumers and goods is engrossed in welfare economics. Welfare measure is concerned with consumer behaviour regarding WTP for a good and WTA compensation because of changes in the quality of the good. The potential function and value of a good is determined by its qualities. Failure of traditional economic theory to explain consumer behaviour to changes in qualities of goods provides another motivation for developing the new approach to consumer theory *(ibid)*. The points highlighted below argue for the justification of the Lancaster theory of value.

- Consumers are not interested in good as such but in their characteristics.
- The relationship between goods and the characteristics they contain is objective.
- Preferences relate to characteristics, budget constraints limits consumption of goods.

Individuals' preferences determine the relative weights assigned to various characteristics in making choices.

5.6.3 Choice Making in Residential Property

Every action taken by man involves a consideration of choices relative to their benefits and costs. According to Vohs et al. (2014), human life is full of constant choices, as far as almost every time one acts, one could probably have done something else. The choice context in this study is limited to the choice made after a moment of deliberation on preferred option among available alternatives. This process is considered by *(ibid)* as a meaningful and effortful internal act as opposed to spontaneous choice made by habit, routine and automatic process on which people soften choose (Bargh, 2002). According to Vohs et al. (2014), the most purposeful way of choosing involves weighing information about available options in order to select the most promising. This is most flexible and potentially adaptive in terms of promoting survival and reproduction especially in the multidimensional social environment *(ibid)*. People feel most confident in their choice decision when they understand the available options and can comfortably compare and evaluate each one (Iyengar, 2000).

The choice of a residential property made by any consumer entails substantial consequences for health, wealth, lifestyle, social network and job opportunity. The key behavioural assumption guiding choice is well defined in standard consumer theory of decision-making. This axiom is a product of intellectual convergence known as utility maximization theory that operates with the principle of bounded rationality. According to Mc Fadden (1986), modern economic choice theory emerged from the assumption that individuals possess market behaviour derived from preferences maximization. Preferences may include random component due to fluctuation in perceptions and attitudes, however, economic, social and demographic variable often modify it.

Most of the studies that involve the application of choice modelling have modelled households' housing choices and its economic value without recourse to the cause of negative externality. This is perhaps due to the efficiency of the property market and the fact that most of the externality are borne by natural phenomenon or activities that are legally permissible and with unintended consequences. However, the novel part of the conceptual framework for this research is the incorporation of the inefficiency in the property market, which affects tenants' choices and WTP. Using

the concept of micro economic theory of utility maximization, the conceptual framework explaining the interaction between the residential property market, the regulatory mechanism and preferences, which determines choice and WTP for the study context is shown in figure 5.2. The regulatory mechanism interacts with the residential property market through the land and environmental health officers. The outcome of this interaction determines the environmental attributes of properties with a particular reference to the occurrence of externalities (properties with and without graves). Tenants are sensitive to the occurrence of externalities as it modifies their preferences and choices. The choices made by tenants reveal their WTP.

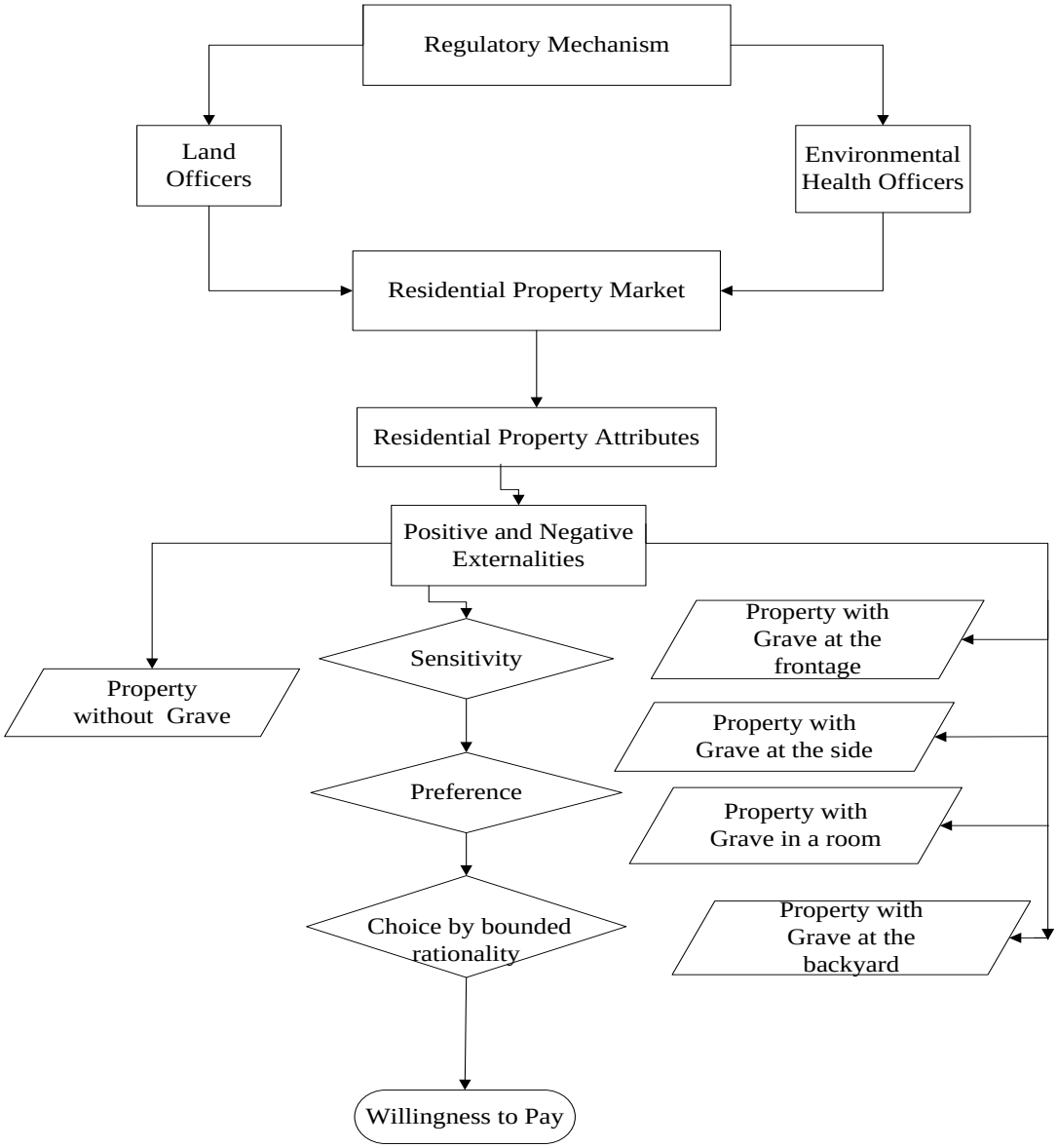


Figure 5.2: Conceptual framework for modelling tenants' choice in an impacted residential property market

5.6.4 Residential Location Theory and Compensatory Choice Process

Alonso (1964) propounded the foremost theory explaining choice of residential location. He theorised location choice on micro-economic assumption from an endogenous spatial context. To Alonso, households' choice of residential location is determined by maximizing the utility function between house rent and travel cost. Essentially, his theory is largely monocentric and conceptualises that employment opportunities are located around the city centre. Considering the shortcomings of Alonso's postulation, attempts were made by Harris (1963), Mills (1972) and Wheaton (1974) to relax the static assumption of the source of job opportunities at the centre to keep pace with reality. Straszheim (1987) noted that these models ignore the impact of exogenous factors particularly neighbourhood and housing characteristics, hence they are incapable of modelling and predicting housing choice in a modern city. The treatment of residential housing choice location by one dimensional distance gradients yield models well suited to analyzing rent-transportation cost tradeoffs and features of the urban spatial structure in the long run particularly when political jurisdictions and neighbourhood effects are not important (*ibid*). He noted that the monocentric models could be adjusted to account for distance dependent varying neighbourhood and environmental qualities. However, when there are fixed characteristics of residential properties and neighbourhood boundaries assume importance at particular locations, discontinuities arise in the choice set which renders the monocentric models less useful. With this deviation from empirical realism of households' housing choice decision in cities with dispersed job opportunities, econometric models and simulation might prove more powerful when discontinuity exist (Straszheim 1987 and Waddell 1996).

According to Mills & Nijkamp (1987) and Guo and Bhat (undated), the largest number of theoretical publications are devoted to analytical view of household location choice. Growing volumes of the study of the theoretical models analysed the relationship between housing choice and commuting distance to work and other location specific amenities in a utility maximization context.

Classically, a rational individual is a choice maximizer; he chooses the best alternative according to some fixed utility function (Aleskerov et al. 2002). This axiom dated back to the eighteen-century remains central to the questions of

consumer choice. Kaplan, et al. (2009) attempted to develop new behavioural protocol for residential choice, which results in the emergence of semi-compensatory residential choice model. However, most of the models used for choice modelling are based on the absolute compensatory process *(ibid).* Based on a clearly specified choice sets, it is assumed that the tenants' residential choice for this study emerge from a compensatory choice process (see figure 5.3 below for the choice protocol).

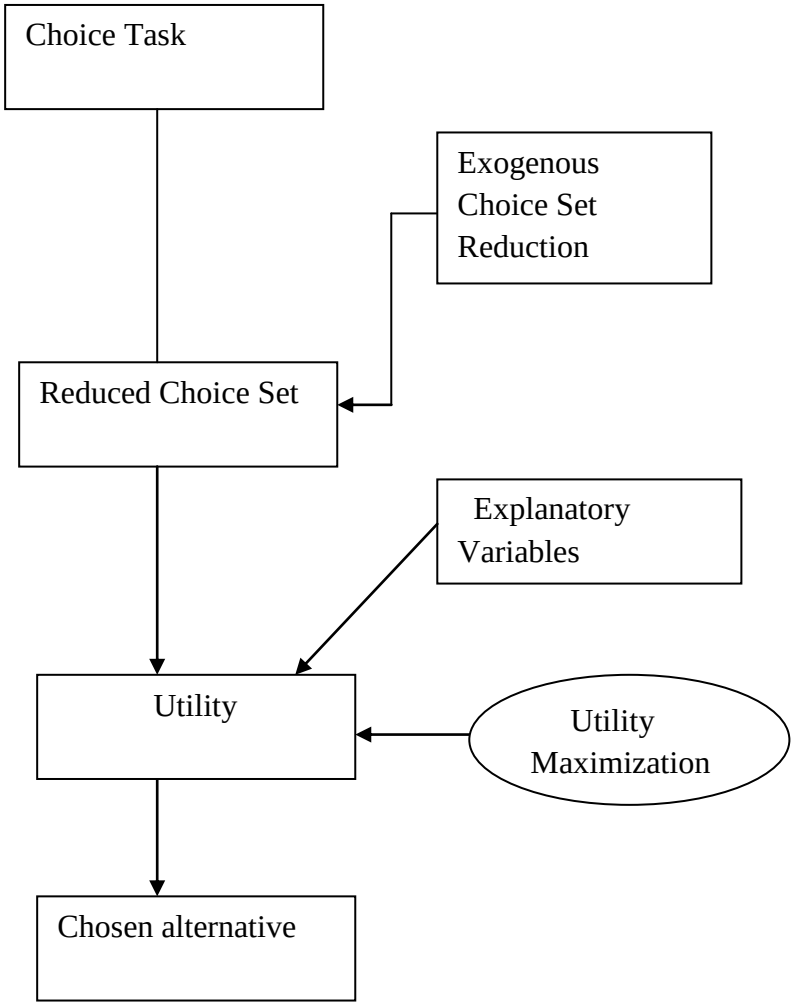


Figure 5.3: Traditional Compensatory Choice Framework Process
Source: Adapted from Kaplan et al. (2009)

5.6.5 Welfare Measure: Willingness to Pay (WTP) and Willingness to Accept (WTA)

The residential choice of a household is a reflection of welfare measure, normally expressed in the form of WTP and WTA. WTP and WTA are two related concepts used to estimate human behaviour or disposition to changes in environmental goods.

Although these concepts connote different meanings, Hoffman and Spitzer (1993) argued from normative economics point of view and conceived their value on any good to be equal. Their view is supported by the microeconomic theory, which states that the individual is on the margin, willing to pay an amount for obtaining a good, as he is willing to forsake it. According to Adamowicz et al. (1993), conventional economic theory suggests that the difference between WTP and WTA should be less than what is realised in experimental test. Conversely, a large disparity with a significant economic implication has been repeatedly found in both hypothetical and simulated markets. Studies carried out by Adamowicz et al. (1993), Brown (1994) Bateman et al (2005) and Biel et al. (2011) identified that this anomaly is peculiar to contingent valuation and provide useful explanation to identify the reason and circumstances where disparity exists. Adamowicz et al. (1993) and Brown (1994) provide similar reasons why disparity may exist. The reasons include; the income effects, loss aversion, protest bid, substitution effects and moral effects.

This study adopts WTP as a welfare measure. WTP is conceptualised as the maximum amount a tenant is willing to pay to rent a residential property with a grave. Having explored WTP as the welfare measure for the study, the next section specifies the econometric model applied for estimating tenants' residential choice and WTP distributions.

5.7 Model Specification (Random Utility Model)

Having debated the theory of residential location and compensatory choice process in the previous sections, this section specifies the model upon which a respondent's choice is founded in this study. According to Vohs et al. (2008), choice is the outcome of a process involving assessment and judgement; that is, the evaluation of different options and making a decision about the preferred option. Neoclassical economic assumption states that every household is a rational being. Hastie & Dawes (2001) compliment this assumption with an argument that different people often think in similar ways on different situations, reflecting the fact that human beings have a common set of cognitive skills. However, Vohs et al. (2014) note that the cognitive skills and their limitations are influential in constraining choices so that choice making in reality varies from what may be seen as ideal and logical.

With the above argument underlying households' choice process, the study is conceptualised on Random Utility Model. This model states that, the indirect utility function for each respondent i(U) can be decomposed into two parts: a deterministic element (V), normally specified as a linear index of the attributes (X) of the j different alternatives in the choice set, and stochastic element (e), representing unobservable influences on individual choice (Hanley et al. 2001). This is expressed in equation (5.1).

$$Uij=Vij(Xij) + eij= bXij+eij \qquad equation(5.1)$$

Therefore, the probability of option g being chosen in a choice set to any alternative option h, is expressed as the probability that the utility derivable from option g exceeds those associated with all other options as stated in equation (2).

$$P[(Uig>Uih)Ah\neq g]= P[(Vig-Vih)>(eih-eig) \qquad \text{equation(5.2)}$$

In order to generate an explicit expression for this probability, an error term is introduced into the distribution. It is normally assumed that they are independently and identically distributed with an extreme value (Weibull) distribution:

$$P(eij\leq t) = F(t) =exp(-exp(-t)) \qquad \text{equation(5.3)}$$

According to McFadden (1973), the distribution of the error term shows that the probability of choosing any alternative g as the most preferred could be expressed in terms of the logistic distribution as stated in equation (5.4). This is specifically known as conditional logit model:

$$P(Uig>Uih,Ah\neq g)=\frac{exp\,(\mu Vig\,)}{\sum_j exp\,(\mu Vij\,)} \qquad \text{.....equation (5.4)}$$

Where μ is a scale parameter, inversely proportional to the standard deviation of the error distribution. According to Hanley (2001), this parameter cannot be separately identified and is therefore typically assumed to be one. As $\mu \rightarrow \infty$ the model becomes deterministic. Equation 6.4 is estimated by means of MNL, which assumes that choices are consistent with the Independence from Irrelevant Alternative IIA Hanley (1998). According to Luce (1959), the IIA property states that:

the probability of two options being selected are unaffected by introduction or removal of other alternatives.

The respective log-likelihood function of the MNL model is stated in equation (5.5) below. Where y_{ij} is an indicator variable, which takes a value of one if respondent i chose option j and zero otherwise.

$$\text{Log L}=\sum_{i=1}^{N}\sum_{j=1}^{J} yij \log\left[\frac{\exp(Vij)}{\sum_{j=1}^{J}\exp(Vij)}\right] \quad \text{.....equation (5.5)}$$

If IIA rule is violated or there is possibility of variable interactions, parameter estimates for WTP from MNL model becomes unreliable; hence the need for a more rigorous statistic. This study applies HB model statistics to overcome IIA to arrive at a more reliable parameter for mean WTP distribution. The process involved in HB model is specified in subsection 5.7.1.

5.7.1 Hierarchical Bayes Model Estimation Using Gibbs Sampler

As provided in the Sawtooth software used, parameter estimation in hierarchical bayes (HB) model is based on iteration process, which is in two parts. The analysis for this estimation starts with 10,000 iterations to achieve model convergence. It proceeds further to the second part with 10,000 iterations on each respondent to draw estimates from marginal distribution in the multivariate variables. In all, the model performed 20,000 iterations to estimate 21 parameters. The iteration process is based on Gibs sampler/ Monte Carlo Markov Chain (MCMC). The Gibbs sampler is a simulation technique that generates random variables from a marginal distribution

indirectly without calculating the density. This technique draws samples using the principle of conditional probability in a multivariate distribution (George & George, 1992). With this estimation technique, it is assumed that the WTP is distributed in the population according to some probability distribution (Pearce et al. 2002). The full conditional probability applied to draw samples estimate for the parameter is provided below, while Figure 5.3 shows the estimation process.

Suppose= (θ_1, θ_2 θ_3..... θ_k

where:

θ = parameters

k = number of last parameter

By drawing θ_1 , which is conditioned, on θ_2 to θ_k from the previous iteration, we have equation (i) as shown below.

$$\theta_1^{(j)} \sim \mathcal{P}\ (\theta_1 \mid \theta_2^{(j-1)} \ldots\ldots\ldots\ldots\ldots\ldots \theta_K^{(j-1)}) \text{.....equation (5.6)}$$

For θ_2, the value is conditioned upon θ_3 to θ_k from the previous iteration we have equation (ii)

$$\theta_2^{(j)} \sim \mathcal{P}\ (\theta_2 \mid \theta_1^{(j)},\ \theta_3^{(j-1)}, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \theta_K^{(j-1)}) \text{.....equation (5.7)}$$

Generically, all other sample is drawn using the equation (iii)

$$\theta_k^{(j)} \sim \mathcal{P}\ (\theta_k \mid \theta_1^{(j)}, \ldots\ldots \theta_{k-1}^{(j)},\ \theta_{k+1}^{(j)} \ldots\ldots\ldots\ldots\ldots\ldots \theta_K^{(j-1)}) \text{.....equation (5.8)}$$

Then the final parameter estimate for K is conditioned upon θ_1 to θ_{K-1} as shown in equation (iv)

$$\theta_K^{(j)} \sim \mathcal{P}\ (\theta_K \mid \theta_1^{(j)}, \ldots\ldots \theta_{K-1}^{(j)}) \text{ .....equation (5.9)}$$

Using the above simulation techniques in HB model, the empirical distribution of WTP estimate is established. This shows that choice experiment is consistent with utility maximization and demand theory, particularly when a status quo option is introduced in the choice set (Bateman et al. 2002)

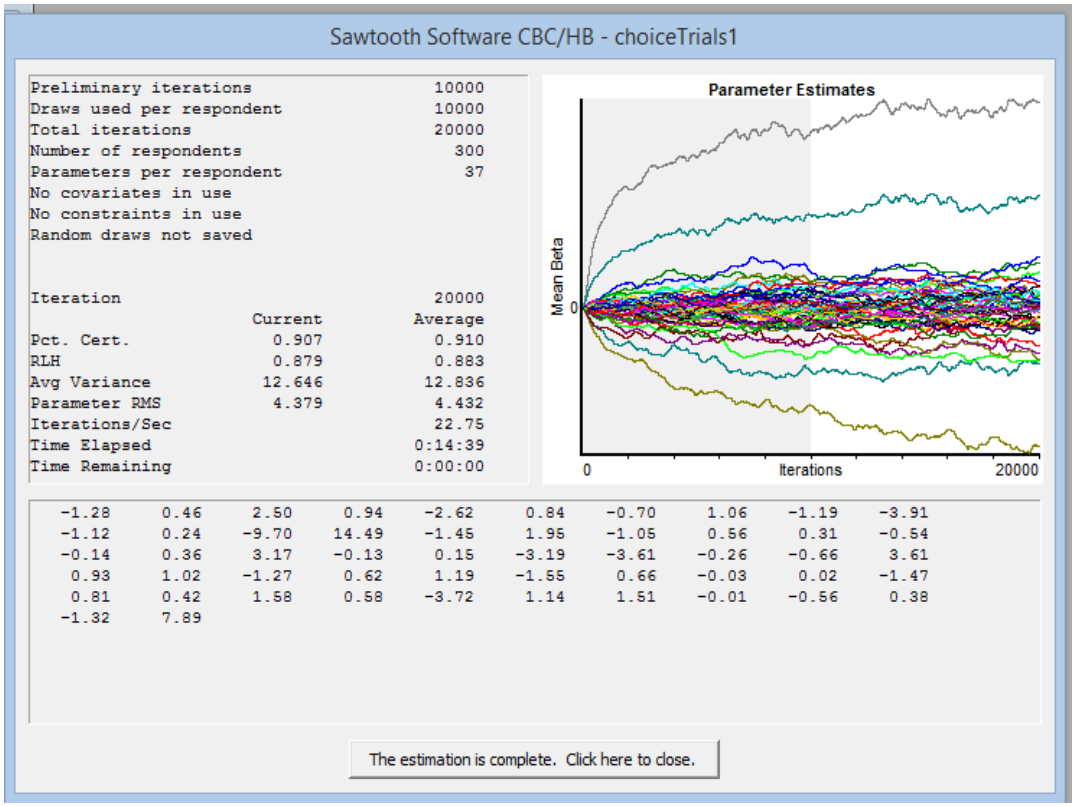


Figure 5.4: HB model estimation process

5.8 Conclusion

This chapter presents a review of the empirical approaches to estimating the impact of negative externalities on residential property value and choice using both RP and SP approaches. Specifically, it touches upon the application of HP model, CV approach and choice experimental approaches. The review produces a mixed report, showing that negative externalities do not always lead to significant reduction in residential property value. The impact also varies across locations; it is contingent upon the households' perception and the market condition. Where the sources of negative externalities do not portend visible threat to life, households tend to be insensitive to its impact. The various findings in the review provide a good understanding of the impact of negative externalities on property value. However, it is acknowledged that the robustness of each methodological approach varies and crucial to the validity of the findings. The later part of the chapter discusses the conceptual framework for the research, which theorises value on the attributes of a property and regards households as rational beings, willing to rent a property with the most desirable attributes. It presents a conceptual paradigm for the study and the

general compensatory choice model guiding consumer choice. It presents a discussion on the model specification "Random Utility Model" which explains the determination of rationality of choice and WTP. The model assumes that rationality of choice is based on perceived similar cognitive ability of all consumers. However, the choice made by a household may be sometimes illogical with the empirical realism; reflecting the influence of budget constraint and other factors that affects human rationality and cognitive skills.

Chapter 6
Research Methodology

6.1 Introduction

This chapter discusses the methodology applied to achieve the aim and objectives of the study. The chapter is structured into fifteen sections. It starts with a discussion on the research design in section 6.2 and focuses on the research philosophy, method and strategies of inquiry. Section 6.3 discusses the research algorithms with specific reference to the Stated Preference (SP) experimental method of inquiry and collection of choice data. Section 6.4 dwells on the choice based conjoint (CBC) design algorithm. Sections 6.5 to 6.7 dwell on simulation of model, which validate the precision of parameter estimates. Section 6.8 provides a brief discussion on the pilot study while 6.9 discusses the main survey. The strength and methodological issues of the SP approach are explained in section 6.10 and 6.11 respectively. Section 6.12 discusses the validity measures applied in the study to confirm the reliability of the parameter estimates. Section 6.13 presents a discussion on the target population while 6.14 dwell on the sample size and method of sampling. The last section presents a conclusion to the chapter.

6.2 Research Design

According to Creswell (2008), research designs are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis. The quality of a research outcome is a function of a clear framework designed to accomplish it. A well thought out design of any research should contain three major elements; namely, philosophy, strategy and method (ibid). Consequently, this research follows the accepted norm to establish a good design framework for the study. The research design flows from the research problems, the research questions, nature of the expected data and the method of analysis. Based on the foregoing discussion, Figure 6.1 present the framework of the research design adapted for the study.

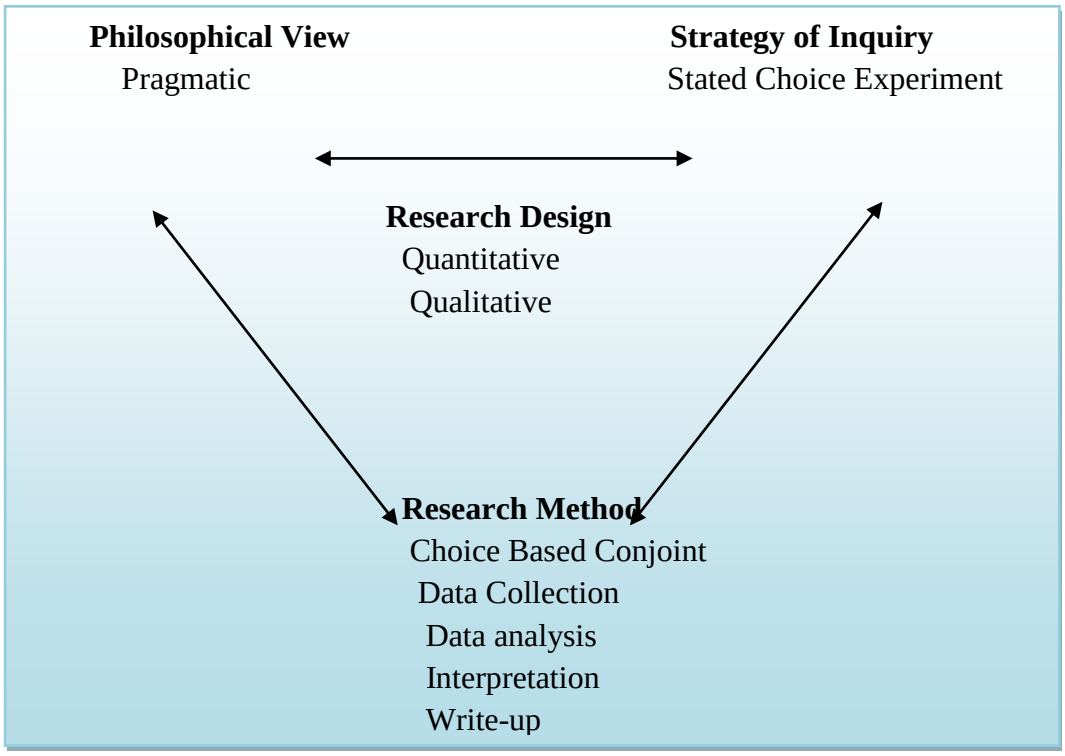


Figure 6.1: Framework for the research design

6.2.1 Research Philosophy

Every research exhibits a link with certain philosophy for guidance. According to Slife and Williams (1995, cited in Creswell, 2008), while philosophical ideas remains largely hidden in research, they influence the research practices and need to be identified. Flowers (2009) argues the need to consider different research philosophies, matters of ontology and epistemology as it applies to a study. They are the parameters, which explain the perceptions, beliefs, the nature of reality and truth that influences the manner of conducting the research from the design stage through completion *(ibid).*

According to Creswell (2003), there are four main types of research philosophies namely: positivism, constructivism, advocacy and pragmatism (see Table 6.1 for the breakdown of the elements of the four worldviews). In order to investigate the multifaceted problems of this research, the study adopts pragmatic philosophy to guide its process; subsection 6.2.2 discusses this in detail. The philosophical worldview applied in the study provides a reasonable explanation for the research method discussed in subsection 6.2.3.

Table 6.1: The four main worldviews

Positivism	*Constructivism*
▪ Determination ▪ Reductionism ▪ Empirical observation and Measurement ▪ Theory verification	▪ Understanding ▪ Multiple participant meaning ▪ Social and historical construction ▪ Theory generation
Advocacy	*Pragmatism*
▪ Political ▪ Empowerment issue oriented ▪ Collaborative ▪ Change-oriented	▪ Consequences of action ▪ Problem centred ▪ Pluralistic ▪ Real world practice oriented

Source: Creswell 2008

6.2.2 Pragmatic Philosophical Approach

According to Cherryholmes (1992) and Scheffler (1974), pragmatic approach to research philosophy emerged from the work of Peirce, James, Mead and Dewey (1974) and other recent works of Murphy (1990), Rorty (1990) and Patton (1990). The choice of this philosophical approach is informed by its focus on the research problem rather than the research objectives. The works of Cherryholmes (1992) Morgan (2007) and Creswell (2008) advance this view to involve commitment to multiple approaches, which form the basis of a mixed method. Considering the flexibility of the pragmatic philosophy, this research applies both quantitative and qualitative strategies to investigate the research problem. The pluralistic nature of the pragmatic philosophy and its real world practice inclination allow for data triangulation in this study.

6.2.3 Research Method

The nature of this research is quantitative; however, some qualitative elements are included to investigate a part of the research problem. The adoption of a quantitative research method is conceptualised out of the immature state of the residential property market in Akure. Observations show that there are no adequate historical

market data; in addition, there is scepticism that the available data may not capture the variable of interest. Therefore, the study opts for stated preference research method. Specifically, it adopts a choice modelling approach involving the application of stated choice experiment as a viable strategy of research inquiry. Chapter seven discusses the SP research in detail.

6.2.4 Strategies of Quantitative Data Inquiry

According to Creswell (2008), strategies of inquiry are types of study quantitative, qualitative and mixed methods designs that provide specific direction for procedure in a research design. This study applies a combination of two basic strategy of inquiry, namely survey and experimental approaches for the collection of quantitative data. They are discussed below.

i. *Survey*

It starts by collecting quantitative data from a population sample group through a survey. This strategy of inquiry involves the use of questionnaire, which facilitates the collection of numeric data to assess respondents' attitudes and opinions to negative externalities. The two basic steps involves in survey strategy of inquiry as it applies to this study are highlighted below.

- *Preparation of Survey Questionnaire*

  The survey questionnaire consists of closed ended questions designed to investigate respondents' socio-economic background, educational, their rights to rented property, perception of an ideal residential environment and their attitudes to the location of graves on residential properties. In particular, questions are prepared within a five points' likert-scale to collect information on the degree of respondents' attitudes to the negative externalities considered in the research.

- *Questionnaire Administration*

  The questionnaires were administered by personal interview. Although this method is time consuming, the advantage is that the field assistants easily overcome any grey areas to the respondents. In addition, administration of survey questionnaires by personal interview facilitates delivery of the questions in the best language understood by some of the local respondents.

ii. Experiment

This is the main source of quantitative data collected in this research. This research method normally applies where there is no reliable and sufficient historic data on the phenomenon under investigation. It involves a set of procedural steps of inquiry with the detailed description in section 6.3.

6.2.5 Strategy for Qualitative data Inquiry

Qualitative data collected for this study are drawn from both primary and secondary sources. Primary data were collected via oral interview by means of semi-structured open-ended questions. Secondary qualitative data are collected from printed material such as Ondo State Environment and Public health byelaws and the Nigerian Urban Regional Planning Act (1992) no 88a.

6.3 Design Algorithm

The design and preparation for the SP are crucial to the achievement of objectives one and two of the study. This is facilitated by a survey software tool known as Sawtooth software, which specialises in the design of conjoint analysis. An appropriate conjoint analysis method must produce choice sets that mimic the actual choices faced by the respondents in reality. To achieve this, the study adopts the theoretical steps involved in SP design put forward by (Bastell & Louviere, 1991; Louviere, 1994; Carson et al. 1994) to design and administer a discrete choice experiment. Subsection 6.3.1, 6.3.2 and section 6.4 discuss the crucial stages involved in the experimental design.

6.3.1 Identification and Selection of Attributes and Focus Group Discussion

This is the information phase and perhaps the most important phase of the choice experiment design. It involves identification of the relevant residential variables that influence tenants' choice. It involves information gathering from secondary sources, focus group and pilot test. This phase helps to ensure the inclusion of attributes that affects residential choices in the choice questions based on respondents' observations. The best understanding of the attributes' levels are determined at this phase to facilitate easy grasp of the final stated choice questions. The following

attributes (explanatory variables) are identified as influencing tenants' residential choice behaviour in the study area.

- Accessibility
- Rent
- Grave
- Building Services
- Compound size and Fence
- Room size and ventilation

6.3.2 Selection of Stated Choice Preference Design with Conjoint Analysis

This study adopts conjoint analysis for the experimental design. Conjoint analysis is a marketing research tool used to measure preferences for product features, to learn how changes to price affect demand for products, and to forecast the likely acceptance of a product if brought to market (Orme, 2006). There are many conjoint designs that could be used to design stated choice questions; they include Choice Based Conjoint "CBC, Adaptive Choice Based Conjoint "ACBC", Full profile conjoint analysis "CVA" and Partial Profile Choice Based Conjoint. However, the number of attributes and levels influences the choice of the design method. Three main design selection criteria put forward by Orme (2006), informed the application of Choice Based Conjoint (CBC) design for this research. They are highlighted below:

- The numbers of attributes and levels included in the choice experiment
- Possible interaction effects
- The population size of the respondents to be considered

6.3.3 Justification for the CBC Design Approach

According to Orme (2009), CBC is the most popular and widely used conjoint technique offering realistic survey that closely mimics the purchase process for product in competitive context. The reasons provided below further confirm the choice CBC design for the study.

- Conjoint survey are often conducted on the SSI (Sawtooth Software Inc). Web. Based on the local circumstance of the respondents with regard to poor access to ICT, the survey is only feasible by paper pencil survey. This nullifies the application of other conjoint methods whose applications are limited to the web and computer assisted personal interview (CAPI).
- The CBC approach provides information on both the main and interaction effects while all other approaches mainly provide information on the main effect.
- CBC is suitable for handling an experiment with a maximum of 10 attributes. ACA and ACBC are used in handling complex choice situations with up 50 or more attributes.

The choice of CBC design method is further justified by the advice provided by the Interactive Conjoint Project Advisor in the Sawtooth Software website (SSI Web). Based on the number of attributes, levels and method of questionnaire administration, the feedback from the Advisor shows that the CBC design has the highest usability of 85 percent among all other design methods (see figure 7.2 for details).

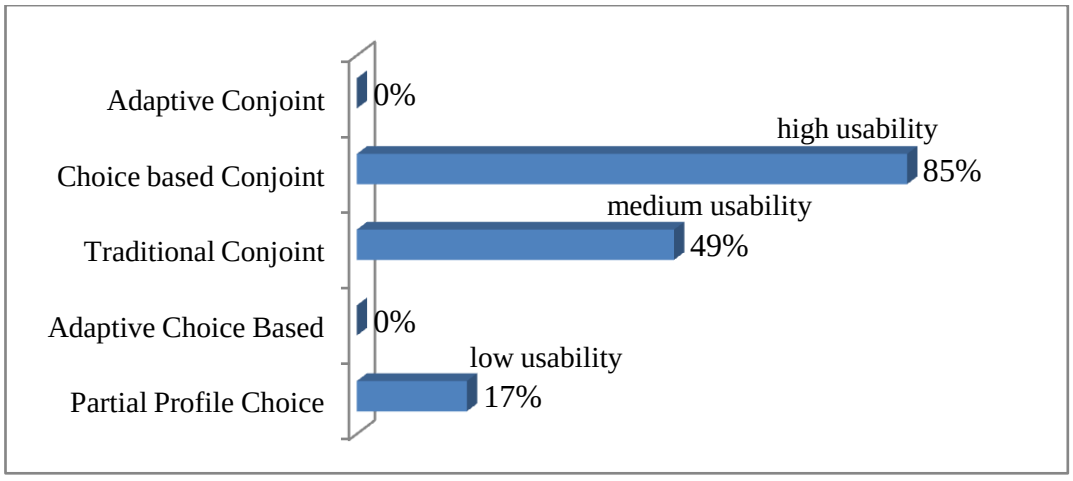


Figure 6.2: Conjoint Project Advisor's Advice on Research Design

6.4 Design Algorithms with CBC

Here, the CBC applies experimental process to design an array of attributes and levels to provide choice sets for the respondents. As pioneered by Louviere (1991), stated choice questions are designed to satisfy the statistical assumptions and

properties of conditional probability choice models. In doing this, care is taken to ensure that the design captures the salient elements of the choice process. Subsections 6.4.1 to 6.4.3 discuss the CBC design process.

6.4.1 Variable Definition

The design starts by defining the variables levels in the CBC within the Sawtooth software environment. It is as shown in Table 6.1

Table 6.2: Assignment of Levels to Variables

Attributes	Levels
1. Rent	5 percent rent discount 10 percent rent discount 15 percent rent discount 20 percent rent discount 10 percent rent increase
2. Building Services	24 hours electricity and water supply 8 hours of electricity and water supply per day 24 hours of electricity and 8 hours of water supply per day 8 hours electricity and 24 hours of water supply per day
3. Grave	Grave at the frontage of the building Grave beside the building Grave at the backyard Grave within the room No grave

4. Accessibility	15 minutes by bus to work and local services 30 minutes by bus to work and local services 15 minutes to work and 30 minutes to local services by bus 15 minutes to local services and 30 minutes to work by bus
5. Compound Size and Fencing	Large compound no fence Large compound with a fence Small compound with a fence Small compound no fence
6 Room Size and Ventilation	Double bedroom with cross ventilation Double bedroom with no cross ventilation Single bedroom with cross ventilation Single bedroom with no cross ventilation

6.4.2 Response type

Having defined the variable levels, the response type is determined. The study adopts discrete choice response type. This response type asks respondents to respond to choice questions by choosing from a set of mutually exclusive and limited alternatives. According to Orme (2006), this response type is the most robust way of asking respondents to answer a choice based task and to choose a product with the highest utility.

6.4.3 The Design

The choice experiment design question used in the survey is discussed under subsections i to vi below.

i. Random Task

To gather reliable data from respondents in a CBC survey, it is essential that the design mimic reality as much as possible. Therefore, the design is prepared in due consideration of the theoretical steps and methods involved in a SP experiment as put forward by Orme (2006), the proponent of the CBC design. He argues that each

respondent should be presented with between 8 and 15 random tasks in the administration of discrete choice questions. This helps to ensure consistent opinion among respondents as too many random tasks could lead to boredom and inconsistencies of opinion. Therefore, 10 random tasks are included in the CBC design for this study.

ii. Random task generation method

In order to ensure that each product concept in the random task possess good statistical quality, the study presents a design that is orthogonal or nearly so. To achieve this, the balanced overlap method is applied. The method facilitates equal frequency of occurrence of attributes and levels on the choice task generated. This enables the provision of more thoughtful responses and a stronger estimation of possible interaction effects. The balance overlap method is a middling position between other random task generation method (complete enumeration and shortcut). It is nearly as efficient as the Complete Enumeration and Shortcut method with respect to main effects; but it is measurably better than the two methods relative to precision of interaction terms (SSI 2013).

iii. Fixed tasks

The rationale behind the inclusion of a fixed choice task is for internal validation of model estimates and as a control experiment. The fixed tasks are designed with choice concepts containing ideal levels of four of the residential attributes, namely: accessibility, building services, compound size and fencing, room size and ventilation. Fixed choice design normally reflects the impact of the variable of interest on another variable while the remaining variables show no deficiency in levels (Orme, 2006). Consequently, a grave and rent discount is included in each concept to assess tenants' residential choices and WTP on the chosen homes. A choice concept with a desirable level of all the attributes without a grave and with a 10 percent increase above the market rent is included. The inclusion of this concept seeks to assess the WTP to avoid a residential property with a grave. In this study, the design includes two fixed choice questions, which are strategically, positioned in tasks 5 and 9 across all the versions of the questionnaire. One of the fixed choices is as shown in Table 6.3. Normally, model estimation of the stated choices excludes

fixed choice data, but reserved for a separate model estimation to confirm consistency of choice opinion.

Table 6.3: Fixed choice

Attributes	**House 1**	**House 2**	**House 3**	**None**
Rooms Size and ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	I would not choose any of these; I will keep looking for a suitable house.
Accessibility	15 minutes by bus to work and local services	15 minutes by bus to work and local services	15 minutes by bus to work and local services	
Building services	24 hours electricity and water supply.	24 hours electricity and water supply.	24 hours electricity and water supply.	
Grave	Grave at the frontage of the building	Grave besides the building	Grave at the backyard	
Compound Size and Fencing	Large compound with fence	Large compound with fence	Large compound with fence	
Rent	-15% discount	-10% discount	-5% discount	

iv. *Concepts Per Choice Task*

The term concept as used here refers to a choice of property while a choice task represents a set of concepts (properties) from which respondents are expected to choose. A common supposition in modern society supported by decades of psychological theory is that the more the concepts to choose from, the better human desire for choice is infinite (Iyengar & Lepper 2000). In preference-matching context where so many concepts are available to choose from, people can have difficulty managing the number (Iyenga & Lepper 2000). Similarly, studies have shown that as the number of choices increases, people tend to consider fewer concepts and process less information concerning their choices (Hauser & Wernerfelt, 1990). As the complexity of choice making increases, respondents often rely on simple heuristics (Payne, 1982; Timmermans, 1993; Payne et al.1993 and Iyengar & Lepper 2000). In order to overcome the challenge of facing too many concepts in a choice set, Louviere (1991) and Orme (2006) advised that it is reasonable to include between 3

and 5 concepts per task. With this advice, three choice concepts per task and a none-option is included in each task. According to Adamowicz et al. (2001) the inclusion of a none-option helps to ensure consistency with market reality where respondents are not forced to rent any property that they are not satisfied with. Having achieved a choice task that is consistent with property market reality, respondents are asked to make their choices if they are faced with the residential property choice options (see Table 6.4).

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Table 6.4: Number of concepts per choice task

Attributes	House 1	House 2	House 3	None
Rooms Size and ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Single bedroom(s)(70 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes to work and 30 minutes to local services by bus	30 minutes bus to work and local services.	15 minutes to local services and 30 minutes to work by bus	
Building services	Stable electricity and water supply	Unstable electricity and stable water supply	Stable electricity and unstable water supply	
Grave	No grave	Grave within the room	Grave at the backyard	
Compound Size and Fencing	Small compound with fence	Small compound no fence	Large compound with fence	
Rent	5% discount	20% discount	15% discount	

v. Questionnaire Version

The rationale behind fielding more than one version of questionnaire is to enable each respondent to have access to a unique version. This helps to ensure that each respondent choice is not affected by others' sense of judgement. For the paper and pencil survey applied in this study, 20 versions of the questionnaire are generated.

Although more versions can be generated, Orme (2006) noted that including more than 12 versions is of little practical benefit.

vi. Attribute Randomization

In order to control for order effect, attributes are randomised within concept to ensure that they occur in a different order to each respondents in different tasks. This helps to reduce error and bias in concept selection.

6.5 Simulation

The study applies two simulation models to generate synthetic data and test the statistical properties of the design. The outcome from this process helps to draw inferences on the behaviour of the design in reality. The first involves the use of OLS, which is set as a simple quick test in the Sawtooth software. The second model is a more advance model with a rigorous statistical capacity. It involves the use of a logit model to test the Root Likelihood (RLH) of the result from random respondents. The next two sections discuss the results of the simulation from the models.

6.6 Simulation with OLS

The capability of the experimental design to estimate the main effect is tested using ordinary least squares. Using the balance overlap method and a seed of 1, the study generate and test the CBC design efficiency of 20 versions of questionnaires. With 10 choice tasks per version, 200 choice tasks is achieved and made available to the respondents. The result from the "OLS" simulation helps to test for orthogonality in level occurrence and the statistical relationship between the ideal and actual standard error in relation to each level of attributes. The result of the OLS simulation is as shown in Table 6.5. The next subsections discuss the statistical properties of the OLS simulation result.

6.6.1 Frequency of Occurrence of Attributes Levels

As shown in Table 6.5, the first line of the OLS outcome shows the attribute and levels. The second column showing the frequencies of occurrence of each attribute's

level follows this. The result shows that the frequencies of occurrence of each attribute level of the last three attributes are equal while the first three show a plus or minus one difference in frequency of occurrence. A design with optimal precision has equal frequency of occurrence at all attribute levels, but in reality, an orthogonal design is merely hypothetical and difficult to achieve. However, a plus or minus 1 difference in the frequencies of occurrence in some attributes' levels indicates that the experimental design is nearly orthogonal.

Table 6.5: Choice Based Conjoint Design Efficiency Test

Att/Lev	Frequency	Actual S.E	Ideal S.E	Efficiency	
1 1	120	(this level has been deleted)			-5% discount
1 2	120	0.1463	0.1452	0.9853	-10% discount
1 3	119	0.1461	0.1452	0.9887	-15% discount
1 4	121	0.1459	0.1452	0.9904	-20% discount
1 5	120	0.1472	0.1452	0.9728	10% rent increase
		Attribute Two			
2 1	150	(this level has been deleted)			24 hours electricity and water supply
2,2	150	0.1272	0.1269	0.9944	8 hours of electricity and water supply per day
2,3	150	0.1281	0.1269	0.9816	24 hours of electricity and 8 hours of water supply per day
2,4	150	0.1283	0.1269	0.9778	8 hours electricity and 24 hours of water supply per day.
		Attribute Three			
3 1	120	(this level has been deleted)			Grave at the frontage of the building
3 2	119	0.1448	0.1435	0.9818	Grave beside the building

3	3	120	0.1431	0.1435	1.0050	Grave at the backyard
3	4	120	0.1435	0.1435	1.0002	Grave within the room
3	5	121	0.1451	0.1435	0.9780	No grave
		Attribute Four				
4	1	150 (this level has been deleted)				Large compound no fence
4	2	150	0.1279	0.1263	0.9758	Large compound with a fence
4	3	150	0.1277	0.1263	0.9791	Small compound with a fence
4	4	150	0.1271	0.1263	0.9872	Small compound no fence
		Attribute Five				
5	1	150 (this level has been deleted)				15 minutes by bus to work and local services
5	2	150	0.1260	0.1261	1.0017	30 minutes bus to work and local services.
5	3	150	0.1269	0.1261	0.9873	15 minutes to work and 30 minutes to local services by bus.
5	4	150	0.1273	0.1261	0.9811	15 minutes to local services and 30 minutes to work by bus
		Attribute Six				
6	1	150 (this level has been deleted)				Double bed size room(s)(100 sq ft),cross ventilation
6	2	150	0.1254	0.1273	1.0304	Double bed size room(s)(100 sq ft,)no cross ventilation
6	3	150	0.1275	0.1273	0.9977	Single bedroom(s)(70 sq ft),cross ventilation
6	4	150	0.1294	0.1273	0.9690	Single bed size room(s) (70 sq ft),no ventilation

Note: The efficiencies reported above for this design assume an equal number of respondents complete each version.

6.6.2 Standard Error's Estimate

The OLS test also provides an estimate of the actual standard error of the design and the ideal standard error in column three and four respectively in Table 6.5. The actual standard error provides information on the data being analysed while the ideal standard error provides information on the estimated standard error assuming the design is truly orthogonal. The pattern and relative magnitude of the actual and ideal standard errors at each level show that they are reasonably distributed. As a rule, the ideal standard error from the orthogonal design must be lower than the corresponding actual error on the experimental data design (Orme 2006). This is achieved in the OLS estimate, however, an exception is noticed on attribute's level (3,3) where the ideal standard error is slightly higher than the actual standard error. Similarly, attribute five level 2 displays a similar anomaly with actual standard error and ideal standard error of 0.1260 and 0.1261 of the design and a hypothetical orthogonal design respectively. Subject to this anomaly, the study applied an advance simulation model test the design. This involves the use of a multinomial logit model, which is discussed in the section 6.7.

6.6.3 Design efficiency

The last column in table 6.5 shows the efficiency of the design in terms of parameter estimation relative to truly orthogonal design. With a value of 1, the design is considered as estimating the welfare measure with utmost precision. For this study, the efficiencies estimated for each attributes level as shown in Table 6.2 tend towards 1. This confirms the efficiency of the design and its ability to estimate parameter with optimal precision.

6.7 Simulation Result for Multinomial Logit Model

Most CBC designs normally employ a simple quick test with OLS, however, where there are possible interactions of variables the statistical properties of the model may not be truly revealed. Addressing the possible interactions of variables in the choice set, an advance test is employed using logit simulation. Unlike the OLS test of design, which offers relative measure of efficiency, the logit test of design estimates the absolute precision of the parameter under aggregate estimation. This is achieved

through a combination of an element of design efficiency and sample size. The design's ability to predict the expected result is assessed using simulated data from a number of respondents. The simulation is repeated for a number times for comparison of results. Overall, 250 respondents is found to be enough for a worst-case scenario while 300 respondents gives an excellent statistically significant figure for model estimation. With 300 respondents and 10 random tasks, the model produces 3000 observations and requires seven iterations for convergence. At this point, an average RLH of 0.26018 is achieved for the seventh iterations which is nearly the same across all the level of iterations (see table 6.6). The RLH value is compared with the minimum RLH required to describe how well the solution fits the data. The minimum RLH, is the reciprocal of the total number of choices per task. In this case, each choice task contains 4 concepts made up of three residential properties and a none-option. Therefore, the reciprocal of 4 gives an RLH of 0.25, which is the minimum RLH that must be obtained to describe how well the solution fit the data. The RLH "0.26018" obtained at model convergence is safely larger than minimum RLH "0.25" that describe how well the solution fits the data.

Table 6.6: Logit Report with Simulated Data

There are 3000 expanded tasks in total, or an average of 10.0 tasks per respondent.

Iter 1 Log-likelihood = -4049.99271 Chi Sq = 217.78074 RLH = 0.25924

Iter 2 Log-likelihood = -4039.86103 Chi Sq = 238.04410 RLH = 0.26012

Iter 3 Log-likelihood = -4039.20211 Chi Sq = 239.36194 RLH = 0.26018

Iter 4 Log-likelihood = -4039.17142 Chi Sq = 239.42333 RLH = 0.26018

Iter 5 Log-likelihood = -4039.17015 Chi Sq = 239.42588 RLH = 0.26018

Iter 6 Log-likelihood = -4039.17009 Chi Sq = 239.42598 RLH = 0.26018

Iter 7 Log-likelihood = -4039.17009 Chi Sq = 239.42598 RLH = 0.26018

*Converged

To avoid non-response bias, it was proposed that 15 percent would choose the none-option but 14.30 percent was achieved from the random response to the logit

simulation. The remaining responses are evenly distributed across the entire categories of responses with 28.03, 28.07 and 29.60 percent across the first, second and third response type respectively (see table 6.7 for details).

Table 6.7: Total Number of Choices in Each Response Category

Options Category	Number of Observations	Percentage
House 1	841	28.03%
House 2	842	28.07%
House 3	888	29.60%
None option	429	14.30%

Source: Multinomial Logit model simulation

The precision of the parameter estimates from logit model simulation of 300 random responses is shown by the standard error of the main effects and interaction effects (1x2) in table 6.8. The aggregate standard error indicates the precision achieved for each parameter measured. No level prohibition is included in the experimental design, hence this enhances the uniformity of the standard error within each attribute. The standard error within an attribute with four levels is approximately 0.037 while 0.044 is observed within attributes with five levels. The standard error (0.09) obtained for interaction is less than maximum (0.1), deemed adequate for precision of estimated parameter by Orme (2006).

Table 6.8: Simulated Standard Error for Logit Estimates

S/N	Standard Error	Attributes' Level
1	0.04492	1 1, 5% discount
2	0.04383	1 2, 10% discount
3	0.04457	1 3, 15% discount
4	0.04381	1 4, 20% discount

5	0.04370	1 5, 10% rent increase
	Attribute 2	
6	0.03877	2 1, 24 hours electricity and water supply.
7	0.03778	2 2, 8 hours of electricity and water supply per day
8	0.03745	2 3, 24 hours of electricity and 8 hours of water supply per day
9	0.03873	2 4, 8 hours electricity and 24 hours of water supply per day.
	Attribute 3	
10	0.04392	3 1, Grave at the frontage of the building
11	0.04405	3 2, Grave besides the building
12	0.04403	3 3, Grave at the backyard
13	0.04268	3 4, Grave within the room
14	0.04316	3 5, No grave
	Attribute 4	
15	0.03873	4 1, Large compound no fence
16	0.03743	4 2, Large compound with a fence
17	0.03745	4 3, Small compound with a fence
18	0.03763	4 4, Small compound no fence
	Attribute 5	
19	0.03812	5 1, 15 minutes by bus to work and local services
20	0.03737	5 2, 30 minutes bus to work and local services.
21	0.03745	5 3, 15 minutes to work and 30 minutes to local services by

		bus.
22	0.03796	5 4, 15 minutes to local services and 30 minutes to work by bus
	Attribute 6	
23	0.03794	6 1, Double bed size room(s)(100 sq ft),cross ventilation
24	0.03746	6 2, Double bed size room(s)(100 sq ft,)no cross ventilation
25	0.03835	6 3, Single bedroom(s)(70 sq ft),cross ventilation
26	0.03881	6 4 Single bed size room(s) (70 sq ft),no ventilation
	Simulated Variable Interaction	
27	0.09752	5% discount x Grave at the frontage of the building
28	0.09505	5% discount x Grave beside the building
29	0.10194	5% discount x Grave at the backyard
30	0.09735	5% discount x Grave within the room
31	0.09884	5% discount x No grave
32	0.09620	10% discount x Grave at the frontage of the building
33	0.09912	10% discount x Grave besides the building
34	0.09727	10% discount x Grave at the backyard
35	0.09529	10% discount x Grave within the room
36	0.09957	10% discount x No grave
37	0.10130	15% discount x Grave at the frontage of the building
38	0.09968	15% discount x Grave beside the building
39	0.09621	15% discount x Grave at the backyard

40	0.09537	15% discount x Grave within the room
41	0.09609	15% discount x No grave
42	0.10129	20% discount x Grave at the frontage of the building
43	0.09943	20% discount x Grave beside the building
44	0.09599	20% discount x Grave at the backyard
45	0.09680	20% discount x Grave within the room
46	0.09750	20% discount x No grave
47	0.09609	10% rent increase x Grave at the frontage of the building
48	0.10108	10% rent increase x Grave beside the building
49	0.09811	10% rent increase x Grave at the backyard
50	0.09742	10% rent increase x Grave within the room
51	0.09384	10% rent increase x No grave
52	0.05221	-13.16983 NONE

The strength of design for this model is 371.16

(The ratio of strengths of design for two designs reflects the D-Efficiency of one design relative to the other.)

6.7.1 Design Efficiency

The design efficiency describes the ratio of strengths of one design "worst case scenario relative to the other "actual design." The efficiency of the experimental design is calculated relative to the worst- case design scenario with 250 respondents. The worst-case scenario design has 2,500 observations while the actual experimental design for the study has 3000 valid observations. Therefore, it implies that the worst -case scenario design is 83.3 percent (2500/3000) as efficient as the actual design. A difference of 50 respondents in the former design led to a loss of 16.7 percent (100-83.3) in the efficiency of precision of the parameter measured.

6.8 Survey

The survey was conducted in two parts, which include a pilot and the main survey discussed in subsection 6.8.1 and 6.8.2 respectively.

6.8.1 Pilot Survey

After designing the choice questions and ascertaining their statistical property, a pilot study was conducted to test the respondents' understanding of the questions. This affords an opportunity to correct issues with the instrumentation and other elements that may arise in the main survey.

6.8.2 Main Survey

The main survey was carried out using structured CBC questionnaire to elicit information on respondents' preferred choices if they are faced with such choice set scenario in reality. Consequential questions are incorporated into the questionnaire to test for consistencies, the genuineness of respondents' preferred choices and internal validation of the choice experiment. This helps to minimize bias and inconsistency in the stated choice experiment. The survey mode involves face-to-face interviews carried out by myself and seven trained field assistants.

6.9 The Strength of Stated Choice Experiment Method

The major advantage of this approach over other choice modelling approach is in its consistencies with the underlying theory of non-market valuation (Pearce et al. 2002). See Table 5.1 in chapter 5 for the comparison of its consistencies with random utility theory among other choice modelling approaches. It builds in a test of scope and helps to eliminate embedding problem that is common with CV valuation method. Unlike other methods, it allows for implicit and explicit validity tests of assumptions made in measuring respondents' behaviour. Other specific advantages of the stated choice experiment are highlighted below:

- One of the major advantages of a choice experiment over contingent valuation is the possibility of combining many choices to show WTP. This advantage paves the way for individual valuation of attributes;

- In terms of eliciting information, choice experiments are designed as choices similar to same survey design advantages as CV (Bateman et al. 2002). This helps to reduce refusals since respondents are more familiar with a choice approach than a payment approach;
- The risk of information inefficiency is reduced by the repeated sampling method (Carson, 1991);
- Strategic behaviour is minimal in choice experiment task, because respondents make choices from a description of attributes. Consequently, respondents are unaware of choices that are over or under-represented in a valuation.
- According to Adamowicz et al. (2001), choice experiment helps to overcome the challenges of yes saying in CV method as respondents appear to vote for an environmental "good cause". This is possible because the respondents choose from a number of descriptions of scenarios (including a status-quo option) rather than a single base case compared to an improved-case scenario; and
- Choice experiment facilitates sufficient collection of variations on all variables of interest; this is however difficult in a revealed preference model because their application is limited by the availability of historic data (Kroes et al. 1988).

6.10 Methodological Issues in Choice Experiment

The major weakness of this SP approach is the hypothetical nature, which may place respondents in an unfamiliar situation where they could not offer complete information (Bateman et al. 2002). According to Bishop and Heberlein (1986), one of the dangers in this method is that, *if you ask a hypothetical question, you will get a hypothetical answer.* Mitchel and Carson (1989) also report that certain misrepresentation may lead to systematic errors and spell out some scenarios that could lead to bias.

The first application of this approach by Thurstone (1931) to explain consumers' preference generated many criticisms from Wallis and Friedman (1942). They questioned the possibility of using a hypothetical scenario to determine human

choice in an experimental situation. However, Sotiris (2005) and Timmermans and Molin (2009) noted that the cloud of criticisms surrounding the SP provoked many developments to validate its robustness. For instance, in response to the criticisms by Wallis and Friedman (1942), Rousseas and Hart (1951) and Mosteller and Nogee (1951) carried out experiments which provide more realism to validate the hypothetical nature of SP in choice determination. Several other attempts to validate the practicality can be seen in the substantial progress made by social scientists in the area of design and implementation of SP methods. Notably, the development of discrete choice questions, contingent ranking and contingent behaviour are plausible advancements of the SP (Bateman et al. 2002 and Hoyos 2010).

Further, the development of a greater awareness of sensitivity to the ways in which scenario specification can influence responses and validity of the value measures is a plausible development to the reliability of the SP result. This development emerges from the contributions of psychology on how people respond to questions and the manner of asking questions from respondents. Timmermans and Molin (2009) argue that the enormity of improvement on the SP approach makes the stated choice experiment the only reliable method where evidence of historic data is lacking.

6.11 The Validity Measures Applied in the SP Approach

According to Swanson and Gleave (1998), validity deals with how well the conjoint design method models preferences and predicts what people really do. This section discusses the salient validity measures applied in the study to reduce methodological issues associated with the SP approach. The measures are conceptualised from Bateman et al. (2002) and Pearce et al. (2004). They explain the various measures that are suitable to validate parameter estimate from SP research. The discussion in the next subsections discusses the validity measures adopted in this study.

6.11.1 Internal Validity.

The reliability of a research finding is highly dependent on the quality of data collected from the respondents. Based on the experimental nature of this research, the consistency of respondents' residential choices is subjected to internal validation. In order to do this, two fixed choice tasks well suited to test the internal validity of

the type discussed by Green and Srinivasan (1990) are included in the questionnaire (see Table 6.3 for a sample of the fixed choice task). The data collected from the fixed choice questions were estimated separately. The result from the estimation provides information on how well the models predict the choices actually made in these additional questions. This is achieved by simply setting up a simulation so that the calibrated choices can be used to predict the possible respondents' choice in the additional task. This method is an effective way of testing how well the choice mechanism used by the respondents has been captured by the model. A high similarity in the estimates of tenants' residential choices confirms the validity of model predictions (see table 8.16 in chapter 8). It implies that the respondents have been very consistent and that the model has captured their preferences. The outcome of the internal validity reduces the scepticism that may surround this SP study.

6.11.2 Content Validity

Content validity validates model estimates from choice experiment by ensuring that the survey description and question are explicitly clear, reasonable and without bias (Bateman et al. 2001 and Pearce et al. 2002). Meticulous survey design and the pilot test at the design stage helps to ensure that the questionnaire used for the main survey are explicitly clear. In addition, the questionnaire consists of consequential questions that motivate respondents to provide thoughtful and truthful information. Although the assessment of content validity is considered subjective, it helps to ensure that all the components are sufficiently represented to elicit valid responses. The guiding checklist provided by Pearce et al (2002) facilitates content validity of the study. With this checklist in place, the research is able to overcome issues relating to scenario design, elicitation, institutional context and sampling. The potential content issues leading to biases and how they were overcome are discussed below.

(i) Issues of Scenario Design.

- Are the choices clearly specified and understood by respondents? This issue is resolved by ensuring that respondents are presented with clear and familiar residential choice designs that are visible in Akure. This is followed by the

interpretation of the choice question in the local language understood by the respondents.

- Is the choice information adequate and reasonable to describe the provision change and payment scenario? Residential property with a grave is a visible source of negative externality in the study area. Respondents are fully aware of this change; hence, a description of residences with a grave in the questionnaire is reasonable and easily understood. The payment scenario is provided in the form of rent discount on impacted residential property.
- Is the trade-off between money and the good plausible? To ensure plausible trade-off relationship between money and residential property with a grave, the rent variable consists of discount with a wide margin.

(ii) Elicitation Issues

- Is the chosen measure of wellbeing appropriate (WTP or WTA)? To overcome this issue in a survey involving respondents residing in heterogeneous homes where no single market rent fits all, the design disregard the Naira value of the payable rent. Therefore, a percentage of what a respondent is willing to pay on an impacted residential property is considered.
- Is the chosen elicitation format appropriate? The survey was conducted by personal interview; by so doing, possible misconception that could lead to error in the preference-matching context is reduced.

(iii) Institutional Context

- Are the methods of provision and allied institutional arrangements plausible? The provision of the survey question to the respondent is quite plausible. For instance, participation in the survey was not mandatory; the study treats inconsistent respondents as outliers and excludes them from model estimation.
- Are respondents likely to feel that they are providing an input to the decision-making process? This problem was solved through the invitation to take part in the survey. Tenants were briefed to realise that the survey was conducted to find out some matters that may affect their social welfare. Consequently, they are fully aware of the policy implication of the information provided.

(iv) Sample Issues

- Is the correct population been identified and sufficiently sampled? Ability to identify the sector of the property market where the research problems exist in Akure answers this question. Selection of the sample is localised within the informal residential market where property with a grave are found.

(v) Survey format Issues

- Is the choice of survey mode appropriate? Ideally, most Choice Based Conjoint experiment design with Sawtooth software are web based. However, the software also come with a paper and pencil survey option. Due to poor internet facility in Akure, the study adopts paper and pencil survey to save time and cost.
- Is the question design able to collect adequate data concerning variables that are likely to explain WTP and WTA to permit construct validity testing? (Pearce et al. 2002). The study overcomes this issue by the inclusion of a payment vehicle in the form of compulsory discount on a residential property with a grave.

6.11.3 Construct Validity

In order to ensure construct validity, two types of validity namely; namely convergent and expectation validity propounded by Bateman et al. (2002) are normally used.

Convergent validity construct is applied in this study by comparing the estimated loss in rent obtained from the choice experiment with the difference in the actual rent passing on similar residential property with and without a grave in the study area. It is evident that the value of a residential property with a grave is significantly lower than a similar property without a grave in the same neighbourhood. However, it is unclear whether the losses in rental on the impacted properties were negotiated between the tenants and Landlords to reflect the negative externality.

6.12 Target Population

The target population for the study is classified into two categories, namely tenants, Environmental Health officers and Land Officers. The choice of each category of respondent is justified in subsection 6.12.1 and 6.12.2.

6.12.1 Tenants

It is assumed that landlords who are currently having a grave in their residences are quite satisfied with it. Therefore, observation shows that the affected parties includes tenants and perhaps adjoining homeowners who may not be disposed to the location of grave within residential properties. In this case, tenants are chosen as the main target population for the collection of quantitative data using some major criteria as advised by Bateman et al. (2002). They include:

- People that are likely to be affected by the location of a grave on rented property;
- People with the knowledge of the location of grave within residential properties and have thought about the negative effect on their welfare;
- People who are likely to bear the financial implications of the negative externalities; and
- The people who are likely to ask for compensation due to the effect of negative externality

The choice of tenants as the target population is further justified due to their limited rights on rented properties, which may lead to the diminution of their socio-economic welfare if landlords use their property rights in an unreasonable manner. Tenants with different socio-economic backgrounds are included in the survey to strengthen the reliability of model prediction across heterogeneous group of people affected by the research's problem.

6.12.2 Environmental Health Officer and Development Control Officer

The study also looks at those organs of the public authority responsible for the prevention of negative externalities in the residential property market. Therefore, Environmental Health Office and the Development Control office of the Ministry of

Lands are identified as the main public authority responsible for the enforcement of compliance with the environmental laws and land use regulations. The data collected from the population are basically qualitative.

6.13 Sample Size.

As discovered from the earliest applications of the stated choice experiment, determination of sample size is largely based on heuristics, norm and the rule of thumb. According to Orme (2006), attempts have been made to determine a reasonable representative of a population sample using a mathematical approach. For instance, the equation provided below was developed by Orme (1998) and had been adopted by many authors to determine the minimum sample size required for a choice based conjoint analysis.

$$\frac{nta}{c} \geq 500$$

Where n= number of respondents

t= number of task

a= number of alternatives per task

500= is the minimum threshold per main effect level

According to Orme (2006), the equation is based on rule of thumb. Rose and Bleimer (2013) also criticise and disapprove the validity of the equation for want of scientific evidence. Therefore, this study relies on a statistically significant sample size derived from a scientifically proven model simulation result, which is based on an acceptable level of standard error. To achieve this, two models namely; ordinary least square and multinomial logit model are employed. The ordinary least square model is as shown below.

$$\sum Yi - \left(\hat{Y}i\right)^2$$

Where;

Y_i = actual standard error

$\hat{Y}i$ = ideal standard error

The aim of simulating dummy variable in the OLS is to achieve a set of actual standard errors that are slightly higher than the ideal standard errors (see design algorithms for detail discussion on OLS model simulation in section 6.6.

With respect to the Multinomial logit model, the aim of the simulation is to achieve a statistically significant Root likelihood (RLH) that predicts reliability of the estimates from random respondents. The MNL model is mathematically represented by the equation provided below.

$$p1 = \frac{e^{v1}}{\sum_i e^{vi}}$$

Where:

P1 = the probability of choosing alternative 1

e = error term

v1= alternative 1

vi= deterministic utility

The least acceptable RLH is the reciprocal of the number of concept per choice task. To achieve this, the model is repeatedly simulated with varying sample sizes. The results from these logit runs are compared to determine the minimum sample size for a worst-case scenario and the best possible size for reliable parameter estimates. The results show that 250 respondents are enough for a worst-case scenario while 300 respondents offer a statistically significant sample size for best parameter estimate. The full process involved in the determination of the sample size is discussed under model simulation in the research algorithms (see MNL model simulation for detail in table 6.6.).

6.13.1 Sample Selection

Observations show that a blend of households with varying income live in Akure, although it is largely dominated by the low income and middle income households. Based on the heterogeneous status of tenants affected by the externality of grave, it is imperative to avoid sampling error by adopting a sampling technique that best suits

the nature of the population. While probabilistic random sampling appears to be adequate, it does not guarantee the inclusion of a representative sample of households from each income group in the study. This inadequacy paved the way for the sampling technique adapted for the study (see detail discussion in sub-section 6.13.2).

6.13.2 Sampling Technique

This study seeks to consider tenants from all socio-economic divides (low, middle and high income group) residing in the informal residential estates. However, a good number of the high income and middle-income earners reside outside the informal residential estates. The adoption of a probabilistic sampling may tilt the frequency of the selected samples towards the low-income group. Consequently, the study adopts a non-probability sampling method known as quota sampling. The method discourages over-representation and under representation of different categories of the tenants' population. Assigning 100 respondents to each category of the income group eliminate random sampling error. This enhances a balance between the population that are underrepresented and overrepresented.

6.14 Scope of the Survey

Residential districts in the study area can be classified into two major groups depending on their locations. The basic classifications include the formal and informal sectors; however, the scope of the survey is geographically restricted to the tenants residing in the informal residential estates of Akure. This is because the phenomenon of the negative externalities of interest is localised within the residential properties in the informal estates. This sector of the residential property market represents the largest means of housing provision in the study area. According to Fasakin & Ogunmakin (2006), more than 70% of plots of land sold in Akure were in informal residential estates.

6.15 Conclusion

This chapter discusses the research methodology for the study. It starts with a discussion on the research design, which connects the research philosophy and

strategy of inquiry with the research method. Based on the pragmatic philosophy, the research method is mainly quantitative with some elements of qualitative methods. Section three identifies the target populations while section four dwells on sample size and justifies the adoption of quota sampling for sample selection. Section five defines the scope of the study. Wrapping it up, the nature and local circumstance of the residential market shaped the research methodology applied for the study. The chapter presents the broad context from which the experimental strategy of inquiry is conceptualised and designed It reviews possible alternative methods that could be adopted and provides justification for the adoption of the choice modelling method. It noted that choice modelling could be carried out by ranking, rating and a stated choice experiment. However, it argues for the stated choice experiment as the best SP method in the absence of historic data and discusses the design algorithms. It reviews the methodological issues and merits associated with this strategy of inquiry. The strength of the stated choice experiment lies in its consistencies with welfare economics among other choice modelling overshadows its weakness. It noted some advantages of this method over RP method and provides validity measures that are brought to bear to validate the reliability of model estimates.

Chapter 7
Presentation and Analysis of Descriptive Data

7.1 Introduction

This chapter presents and analyse the descriptive data. The aim is to provide an analysis of data on objectives one and five of the study. It starts with the presentation and analysis of data on respondents' socio-economic characteristics in section 7.2. Section 7.3 examines respondents' assessment of development control activities while 7.4 analyse the data concerning tenants' awareness of property rights on their residences. It progresses to section 7.5 to establish respondents' familiarity with the negative externalities of a grave on a residential property, their reaction to it and possible effects. Section 7.6 analyses respondents' duration of stay and suitability of the current homes Section 7.7 analyse the possible effects of the externalities of graves in the respondents' current residences. Section 7.8, 7.9, 7.10, 7.11 and 7.12 dwell on income effect and the impact of education, location, family size and the size of residential choice decision makers on home choice respectively. Section 7.13 analyse the result of the null hypotheses test. Section 7.14 presents and discusses the qualitative data collected on the legal implications of the use of residential properties for graves. The last section wraps up the chapter with a conclusion.

7.2 Respondents Neighbourhood Distribution and Socio-Economic Characteristics

The study attempts to minimize bias affecting the reliability of model prediction in order to enhance the robustness of generalising findings across a heterogeneous group of respondents. This section presents and analyses respondents' socio-economic group data. Parts of the results are crosstab with other variables for a insight into their influence on residential choice.

7.2.1 Distributions of Respondents across Neighbourhoods

The study area is divided into ten residential neighbourhoods. The respondents are evenly distributed across seven of the neighbourhoods. The remaining three (namely

Ayedun & Oke Ijebu, Oke Aro & Ijoka, and Aule & Oke Ogba) accommodate the remaining questionnaire from neighbourhood where the targeted numbers of respondents are unmet. The details of the respondents' distributions and its spatiality across districts are shown in Table 7.1. and Figure 7.1 respectively.

. Table 7.1: Breakdown of Respondents by Neighbourhood.

S/N	Districts	Frequency	Percentage (%)
1	Core Area	24	8.00
2	Ayedun & Oke Ijebu	43	14.30
3	Sijuwaade & Oluwatuyi	15	5.00
4	Oke Aro & Ijoka	52	17.30
5	Fanibi	25	8.35
6	Oyemekun Road	25	8.35
7	Isinkan & Ondo Road	22	7.30
8	Aule & Oke Ogba	46	15.30
9	FUTA & Alejolowo	28	9.30
10	Orita Obele & Gbeleaje	20	6.70
	Total	300	100.0

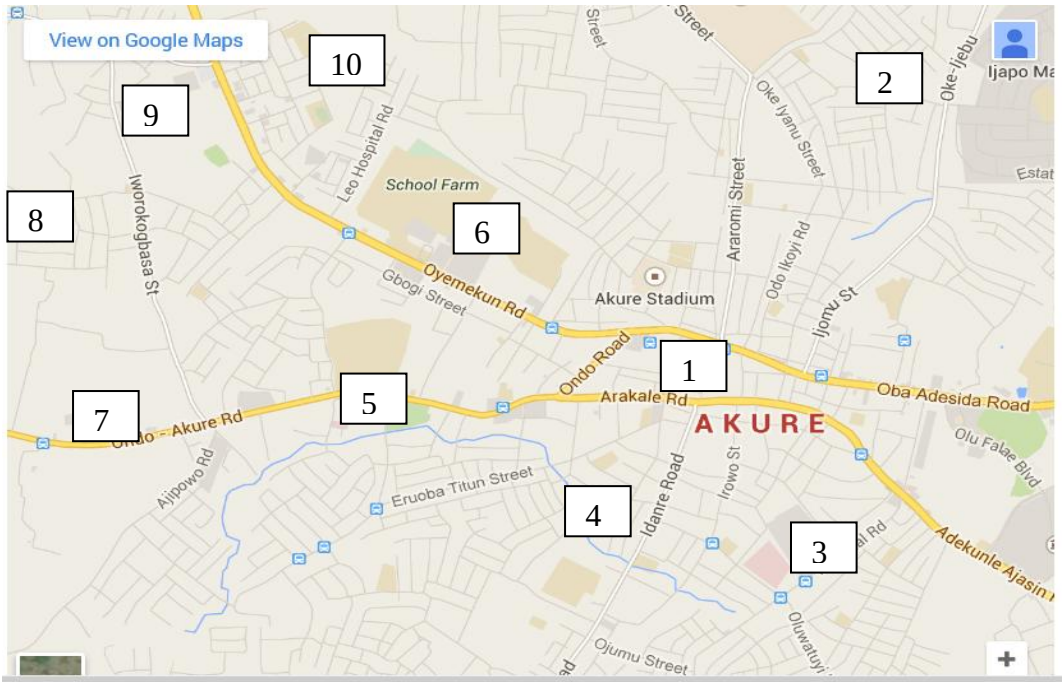


Figure 7.1: Map of Akure showing respondents' residential districts.

7.2.2 Classification of Respondents into Income Groups

As argued in section 9.2, generalizing a research finding across a heterogeneous group of respondents is only valid if representative samples of the heterogeneous population are included in the survey. Therefore, tenants from all possible socio-economic groups, (Low, middle and high-income group) are included in the survey. However, Low and Middle income groups are the dominant renters of residential properties in the study area; each represents 46.3 percent and 44.0 percent respectively. High income tenants accounts for 9.7 percent of the properties occupied by tenants; this shows their ability to afford owner occupied properties. (See Table 7.2 for detail description of income category).

Table 7.2: Distribution of Respondents' Income Groups

Category	Frequency	Percentage (%)
High income group	29	9.7
Middle income group	139	46.3
Low income group	132	44.0
Total	300	100.0

7.2.3 Respondents' Types of Residential Properties

Five possible types of residential properties are available to potential tenants in the study area. However, income influences the distribution of the respondents across property types. Figure 7.2 reveals that properties with high rental value such as duplexes and detached bungalows are not commonly available to let. They represent 0.3 and 13.3 percent among the type of properties rented by the respondents respectively. Self-contain accommodation represents 14.7 percent while blocks of flats and rooming apartments account for 35.0 and 36.7 percent respectively. Uneven distribution of the types of houses across the neighbourhoods suggests that most of the residential properties are of low and middle-income housing.

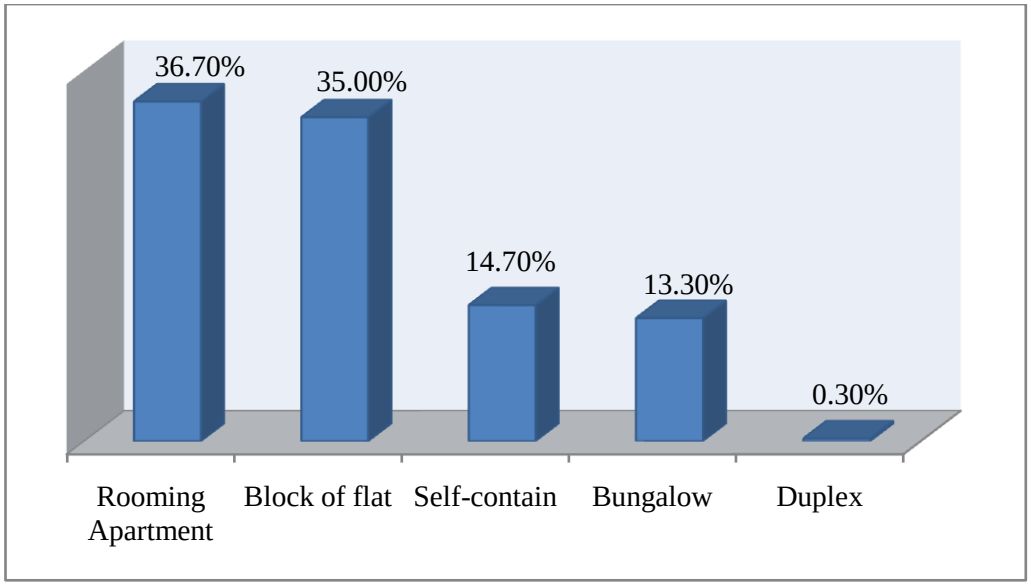


Figure 7.2: Respondents' Types of Residential Properties

7.2.4 Respondents' Level of Education

The study collected data on tenants' educational attainment to determine its influence on residential choices. The analysis shows that respondents with a bachelor's degree are most popular and represents 35 percent. Respondents with a diploma, which represents 26 percent, closely follow this. Tenants with postgraduate qualification represent 17.3 percent. Respondents with only formal education at secondary school and primary school level account for 17 and 3.7 percent respectively. Less than 1 percent had no formal education (see Table 7.3 for details). The high rate of respondents with formal education background in the city is perhaps due to the administrative status of the city and as the capital of Ondo state. Subsection 7.13.4 analyse the test of hypothesis and the specific impacts of education on tenants' residential choices.

Table .7.3: Educational Qualifications Obtained by Respondents

Educational Qualification	Frequency	Percentage (%)
Nil	2	0.7
Primary school Cert.	11	3.7
Secondary school Cert.	51	17.0

NCE/OND	78	26.0
Bachelors/HND	106	35.3
Postgraduate	52	17.3
Total	300	100.0

Source: Author's Fieldwork (May-July, 2013)

7.2.5 Residential Choice Decision Makers in a Household

Data collection on the number of people responsible for home choice decision reveals that most decisions are not unilateral among respondents. The analysis shows that 44 percent of the respondents with a male head of household take their housing choice decisions jointly with their spouses. Further, 17 percent of the respondents involve their wife and children in their housing choice decisions, while 15 percent of the female respondents declared that they take housing choice decisions with input from their husband (see Table 7.4 for detail). In aggregate, 66.3 percent of the respondents take a joint decision on housing choice. This is in consonance with previous literature, which reports that residential choices are mostly a joint decision in most households. Only 33.7 percent of the respondents take housing choice decisions alone.

Table 7.4: Home Choice Decision Makers

Decision Makers	Frequency	Percentage (%)
Just me	101	33.7
Myself and my wife	132	44.0
Myself, wife and children	52	17.3
Myself and my Husband	15	5.0
Total	300	100.0

7.3 Respondents' Assessment of Development Control Activities

This section addresses respondents' perception of compatibility of developments in both formal and informal residential estates in the study area. It expands on this to consider their opinion on performance of development control activities on the two sectors. It assesses landlords' use of property rights from the tenants' point of view and explores tenants awareness of their property rights in leased properties.

7.3.1 Respondents' Judgement of Compatibility of Developments in their Residential Neighbourhood

Assessment of respondents' perception of an ideal residential environment relative to the current situation on their street involves the use of a five point likert scale. Based on the respondents' sense of judgment, the analysis reveals that 9.0 percent are of the opinion that residential property developments on their streets are highly compatible while 47 percent say the developments are compatible. Further, 35 percent of the tenants note that development on their streets are fairly compatible, while 22 percent note that residential properties on their streets are characterized by incompatible developments. Only 1 percent of the respondents do not know whether the developments are compatible or not (see Table 7.5 for details). This implies that very few people have no perception of an acceptable residential environment

Table 7.5: Compatibility of Developments on Respondents' Streets

Response	Frequency	Percentage (%)
Highly compatible	27	9.0
Compatible	141	47.0
Fairly compatible	107	35.7
Incompatible	22	7.3
I don't know	3	1.0
Total	300	100.0

7.3.2 Assessment of Compatibility of Developments in Informal Estates

Set within the tenants' perception of compatibility of developments in the informal residential estates, respondents commented on the efficacy of development control in the residential property market. The analysis reveals that 9.7 and 51.7 percent strongly agree and agree respectively that development control activities are commendable in the informal estates. While 12.3 percent neither agree nor disagree that development control had done enough to restrict landlords' rights within permissible land uses, 23.0 percent disagree that government control on a landlord's use of property rights in their residential districts is commendable. Similarly, 3.3 percent of the respondents strongly disagree that government control on landlords' property rights deserve no commendation (see Table 7.6 for details).

Table 7.6: Respondents' Assessment of Development Control Activities

Opinions	Frequency	Percentage (%)
Strongly agree	29	9.7
Agree	155	51.7
Neither agree nor disagree	37	12.3
Disagree	69	23.0
Strongly disagree	10	3.3
Total	300	100.0

7.3.3 Assessment of Development Control in Formal and Informal Estates

Further, tenants' knowledge of compatible residential land uses was determined by comparing their assessment of development control activities in the formal and informal residential markets. Firstly, the analysis shows that 57.0 percent and 37.3 percent of the respondents strongly agree and agree respectively that the impacts of development control activities are effective in the formal residential estate than the informal residential estates. Secondly, 3.0 percent neither agree nor disagree that development control activities are either effective or ineffective in the formal than

informal residential estates. Thirdly, while 2.0 percent disagree that residential land use control are better in formal residential estates than informal residential estates, less than 1.0 percent strongly disagree that residential land use are not better controlled in the formal residential areas than the informal residential estates (see Table 7.7 for details).

Table 7.7: Effectiveness of Development Control in Formal Residential Estates

Opinions	Frequency	Percentage (%)
Strongly agree	171	57.0
Agree	112	37.3
Neither agree nor disagree	9	3.0
Disagree	6	2.0
Strongly disagree	2	0.7
Total	300	100.0

7.4 Respondents' Self-Assessment of Property Rights

This section assessed tenants' residential property rights. It goes further to analyse tenants' perception of landlords' rights of use and its implication on their welfare.

7.4.1 Awareness of Tenants' Property Rights

Addressing property right from Not in My Backyard concept (Nimbyism), the study investigates tenants' awareness of other property rights apart from use rights. The two responses to the close-ended questions classified the respondents into two schools of thoughts as shown in Table 7.8. The first school of thought constitutes 66.3 percent of the respondents who note that they do not have any rights over their rented apartment. They are of the opinion that property owners have absolute right of use on their properties. The latter school of thought comprises of 33.7 percent of the tenants that are aware of their rights as tenants. However, further enquiries on the enforcement of the tenants' rights reveal divergent opinions. While some of the tenants know their rights and are able to enforce them, some are aware of the rights

but could not enforce them within the confines of legal provision. They note that threats of eviction (usually) by property owners, unending court cases and weak legal provision are the barriers to enforcement of tenants' rights. In sum, despite the fact that 74.0 percent of the tenants have some forms of tertiary education the level of awareness of respondents' rights on rented properties is unacceptable.

Table 7.8: Tenants' Right Self-Assessment

Responses	Frequency	Percentage (%)
Yes	101	33.7
No	199	66.3
Total	300	100.0%

7.4.2 Tenants' Assessment of Landlords' Use of Property Rights

The analysis of compatibility of development in section 7.4 confirms a failure in development control activities in the informal residential estates. A cumulative of 94 percent of the respondents agreed that development control is more effective in the formal than the informal residential estates. This subsection attempts to validate the notion by assessing respondents' perception on landlords' responsibility to ensuring unfettered enjoyment of a rented property throughout the lease period as provided in the lease covenants. The analysis reveals that 10.3 and 53.3 percent strongly agree and agree respectively that landlords utilise their property rights to optimize tenants' welfare throughout the lease period. Only 9.3 percent of them neither agree nor disagree that landlords are fair to tenants in the usage of property rights, while 23.3 percent and 3.7 percent disagree and strongly disagree respectively that landlords use their property rights to ensure that tenants have optimum enjoyment of a rented apartment (see Table 7.9 for details). These findings once again demonstrate a weak government intervention in the property market as recorded in past attempts to control landlords. For instance, as noted by Oni et al. (2012) attempts to regulate house rent through the enactment of rent control edict in Lagos is a failure. This is the case in Ondo state and many other Nigeria states that attempt to exercise control on house rent in the PRS prior to the recent attempt in Lagos.

Table 7.9: Respondents' Assessment of Landlords' Use of Property Rights

Opinions	Frequency	Percentage (%)
Strongly agree	31	10.3
Agree	160	53.3
Neither agree nor disagree	28	9.3
Disagree	70	23.3
Strongly disagree	11	3.7
Total	300	100.0

7.5 Assessment of Respondents' Knowledge of Negative Externalities

In every research, it is essential that respondents have adequate knowledge of the research problems to certify the collection of reliable data from the population sample. This section examines tenants' knowledge of a negative externality "grave" in their current residences or adjoining properties and assesses their attitudes to such practice. The specifics of the analysis presented in this section connect to the objective of the study.

7.5.1 Location of a Grave within Residential Properties in the Study Area

The study assesses tenants' understanding of the negative impacts of graves by their awareness of its location within residential property on their streets. The survey reveals that 20 percent of the respondents had seen properties with a grave at the frontage on their street, while 8.7 percent are of the opinion that properties with graves at the sides are common on their streets. Further, 6.0 percent of the respondents have seen a grave at the rear of residential properties in their street while 22.7 percent have seen graves located in different parts of buildings on their streets. However, 42.7 percent of the respondents have no graves on their streets (see Figure 7.3 for details). Over 57 percent of the respondents have seen graves on their streets and their rented apartments. This level of awareness confirms that respondents are able to give reliable data in response to the questions asked in the survey.

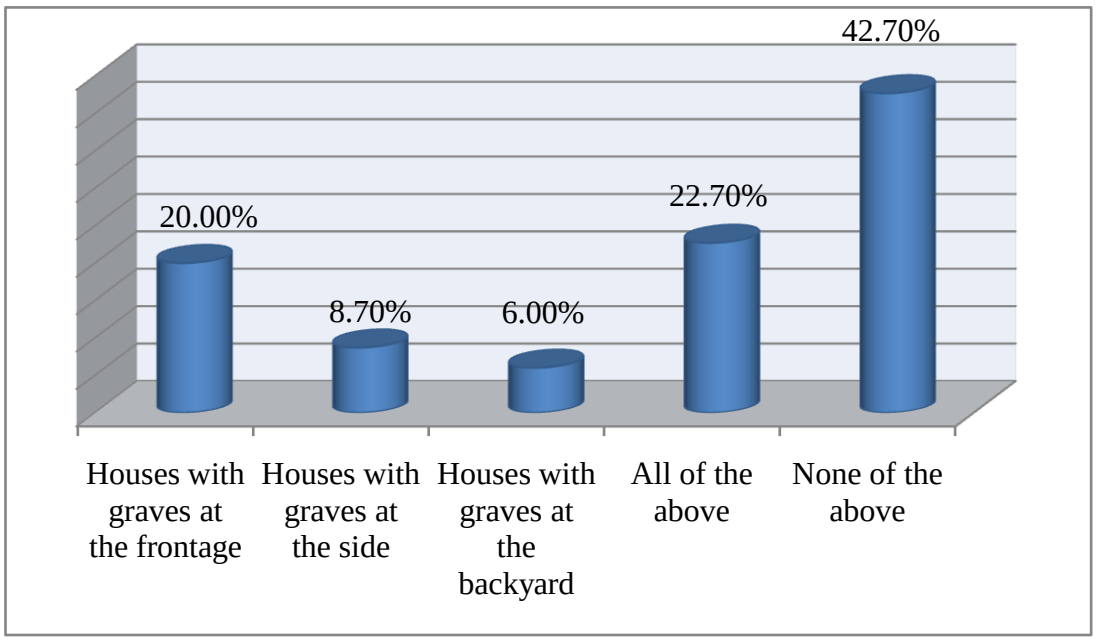


Figure 7.3: Respondents' Knowledge of Properties with Graves on their Streets

7.5.2 Potential Negative Externalities in Respondents Homes

Respondents' exposure to negative externalities is shown in Table 7.10. The analysis shows that 12.7 percent of the respondents are currently residing in houses with graves. While 42.3 percent have shops in front of their residences, 1.3 percent of the respondents reside in properties with both graves and shops. However, 43.7 percent of the respondents reside in houses without graves and shops. This analysis shows a mix of respondents who are currently residing in properties with graves and without graves are considered for the survey. Based on this, a prima-facie case of negative externalities affecting tenant social welfare and rent is established.

Table 7.10: Presence of Negative Externalities in Respondents' Homes

Negative Externalities	Frequency	Percentage (%)
Shop	127	42.3
Grave	38	12.7
None	131	43.7
All of the above	4	1.3
Total	300	100.0%

7.5.3 Intolerance to Some Common Source of Negative Externalities in Akure

Tenants' perception of some common potential developments constituting negative externalities in residential properties in Akure reveals varying degrees of intolerance. From Table 7.11, over 50 percent of the respondents strongly maintained that graves should not be located within a residential property. This is followed by 23.7 percent of the respondents who do not support the location of bread bakeries within residential properties because of heat emission to adjoining properties. Further, 4.3 percent of the respondents are highly intolerant to the presence of shops in residential buildings. Though 21.3 percent would not tolerate the location of any of the aforementioned developments within residential properties, less than 1 percent tolerates all the potential sources of negative externalities within a rented property.

Table 7.11: Intolerance to Graves and other Potential Negative Externalities

Negative Externality	Frequency	Percentage (%)
Shopping complex	13	4.3
Bakery	71	23.7
Grave	151	50.3
None	64	21.3
All should be allowed	1	0.3
Total	300	100.0%

7.5.4 Respondents' Opinion on Location of Graves in Residential Properties

Tenants' opinions on the location of graves within residential properties reveal that 66.7 percent do not support the location of graves within residential properties. Only 1.7 percent are in support of such practice. The analysis shows that 13.3 percent are indifferent to it while 18.3 percent state that people should be allowed to locate graves wherever they prefer (see Table 7.12 for details). Although the opinion is divergent, it is apparent that the result is skewed towards the tenants who do not support the location of graves on residential properties.

Table 7.12: Respondents' Opinions on the Location of a Grave within a Residence

Opinions	Frequency	Percentage (%)
I support the location of graves within homes	5	1.7
I do not support the location of graves within homes	200	66.7
I am indifferent to it	40	13.3
Graves should be allowed in any preferred location	55	18.3
Total	300	100.0%

7.6 Tenants' Duration of Stay and Suitability of Residential Properties

This section analyses the duration of residence of respondents in their current home. It assesses the suitability of residential location relative to their daily activities and intentions to move homes within the next year. The specific of the discussion in this section is to provide a basis for drawing a conclusion on the immediate effects of the location of graves on tenants' current residential choices.

7.6.1 Types of Tenancies

Types of tenancy arrangements in the study area show that a yearly tenancy is most common and accounts for 88.3 percent of tenancy types among the respondents. A mere 8.7 percent with half-yearly tenancy follow this while 1.7 and 1.3 percent are on quarterly and monthly tenancies respectively (see Table 7.13 for details).

Table 7.13: Respondents Types of Tenancy

Types of Tenancy	Frequency	Percentage (%)
Monthly	4	1.3
Quarterly	5	1.7
Half yearly	26	8.7
Yearly	265	88.3
Total	300	100.0

7.6.2 Mode of Renting Residential Properties

As shown in Figure 7.4, 52 percent of the tenants rented their homes directly from the landlords. Twenty eight percent who employ the services of caretakers follows this, while 20 percent of the tenants employ a professional estate surveyor to rent their homes. This analysis shows that respondents generally prefer no intermediary to rent a home. Surprisingly, the analysis shows that where an intermediary is involved in letting, most tenants patronise the non-professionals. This raises a doubt on the possibility of protecting the rights of a tenant where a landlord uses his property in a manner that contravenes his duty of care.

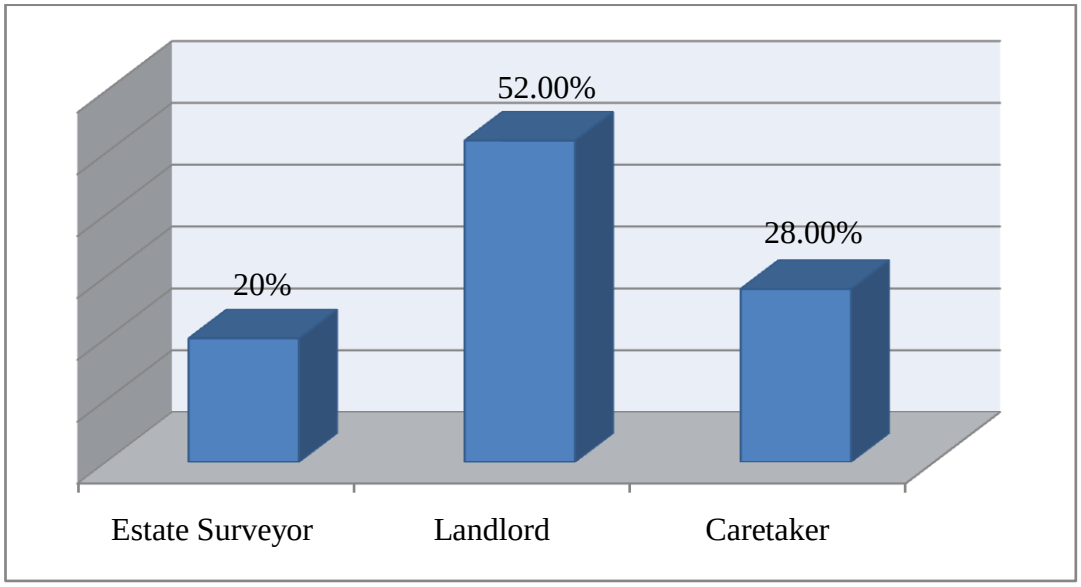


Figure 7.4: Mode of Renting Residential Properties

7.6.3 Duration of Residence in Current Homes

Table 7.14 shows that over 72 percent of the respondents have resided in their current accommodation for between one and five years while 22.7 percent have lived in their current accommodation between six and ten years. Only 5 percent of the tenants had lived in their present apartments for eleven years or more. Overall, the majority of the respondents have resided in their current apartments for a relatively short period. All things being equal, tenants do not move home frequently and tend to reside in properties that are suitably located relative to their daily activities. The discussion in subsections 7.6.4 and 7.6.5 (on suitability of a property's location and the possibility of moving the next year) is used as a basis to forecast possible

premature decision to move home due to negative externalities of grave in respondents' current rented apartments.

Table 7.14: Respondents' Duration of Residence in Current Residence

Duration (years)	Frequency	Percentage (%)
1-5	217	72.3
6-10	68	22.7
11-15	15	5.0
Total	300	100.0

7.6.4 Suitability of Respondents' Abode for Daily Activities

This subsection analyses the suitability of tenants' residential location to confirm their preferences for current residential choices. It draws from the analysis to express the trade-off a tenant would make if a grave were suddenly located in their current homes. The findings show that 69.3 percent of the respondents consider it as the best location for their daily activities whilst 30.7 percent see it as not the best location (see Table 7.15 for details).

Table 7.15: Suitability of Respondents' Residential Location for Daily Activities

Responses	Frequency	Percentage (%)
Yes	208	69.3
No	92	30.7
Total	300	100.0

7.6.5 Possibility of Moving Home

As shown in Table 7.16, respondents' stability in current residential properties reveals that about 40.0 percent did not intend to move homes within the next year. This implies satisfaction with the current choice of properties. Conversely, 60 percent of the respondents would like to move home within the next year; further enquiries on this shows that, such proposal is mainly premised on the intention to

move to owner occupied apartments. With this information, the next section examines the possible effect of graves in the respondents' homes and possible reactions to them.

Table 7.16: Possibility of Moving Homes Within the Next Year

Responses	Frequency	Percentage (%)
Yes	181	60.3
No	119	39.7
Total	300	100.0

7.7 The Effect of Externalities of Graves on Residential Properties

This section analyzes the effects of properties with graves on respondents' welfare. It analyses the reactions of tenants to the location of graves on their current homes. It starts with a presentation of data on the five possible effects of graves on respondents as provided in the questionnaire. It goes further to present a logical analysis of the effect of graves, based on the relationship between respondents' intention on home movement and other variables discussed in section 7.6 (such as the suitability of the current residential locations).

7.7.1 The Effects of the Externality of a Grave on Respondents

The psychological effect is the highest possible effect on respondents as it accounts for 27.0 percent of the negative externalities produced from graves. Respondents who note that the location of graves in their dwellings would affect their thought process constitutes 25.0 percent followed this. While 17.7 percent could not simply explain the horrible effect of the sight of a grave in a residential property, 8.7 percent says it would affect the level of aesthetic desired in a home. Lastly, 21.7 percent of the tenants state that the location of graves in their homes would have no negative effect on them. The effects of the externalities of graves on the respondents substantiate the reason why a high percentage of the tenants are not in support of the location of graves within residential properties as shown in Table 7.5. This is an indication of the possible negative effects that would affect respondents' welfare.

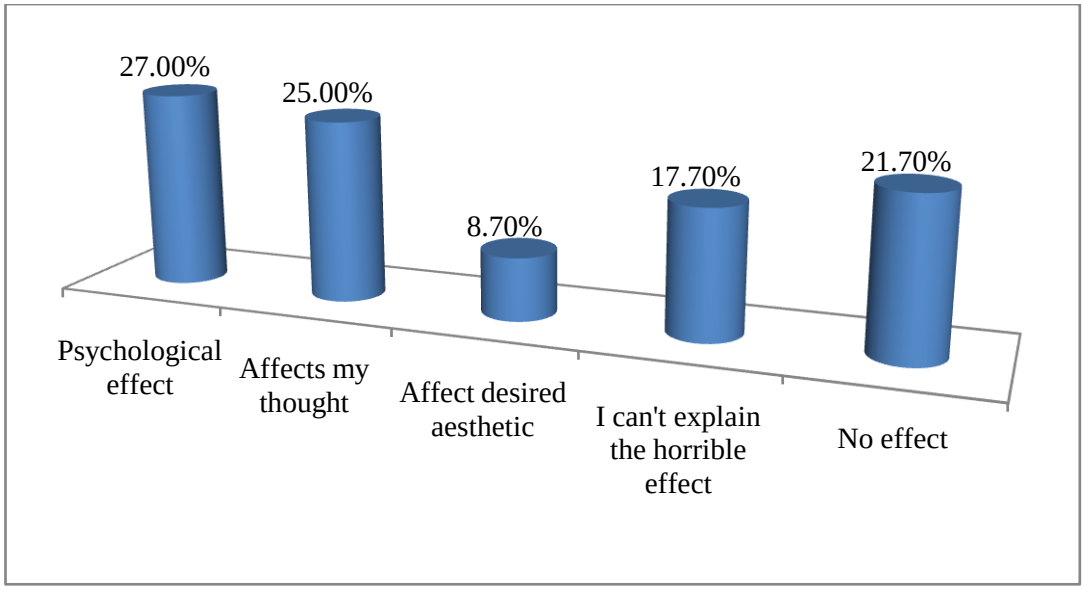


Figure 7.5: Impacts of Negative Externalities of Graves on Respondents

7.7.2 Tenants' Reactions to Sudden Location of Graves in Current Homes

In the last sub-section, five possible effects of residential properties with graves on the respondents are analysed. This subsection provides a salutary discussion for a deeper understanding of the effects of graves on home movement. Figure 7.6 shows that a number of the respondents representing 34.3 percent can barely endure the sudden location of graves within their residential properties; they would move home as soon as their leases expire. However, 32.7 percent cannot stand the sight of a grave in a house; they would move home before their tenancies periods expire. This suggests that they may not be willing to pay any amount as rent on such properties. Conversely, 33.0 percent will continue occupation of their present properties for as long as they wish despite the location of graves in them. On the aggregate, 67 percent of the respondents, which comprises of those, moving before and after expiration of current tenancy, will take a premature decision to move home. The effects on the movers are twofold. Firstly, to those moving home before the expiration of current tenancy, it implies a loss of financial resource. This is because most landlords would not refund the balance of the unexpired term, as the decision to terminate the tenancy is not due to quit notice. Secondly, it implies a loss in both social welfare and financial resources to those waiting to move home after the expiration of their current leases. The percentage of respondents who would move homes to escape the negative externalities of graves is consistent with the percentage

of respondents (66.7 percent) who are of the opinion that graves should not be allowed within residential buildings (see table 7.12). The figure recorded in this regard is indicative of the respondents' willingness to pay for residential properties with graves.

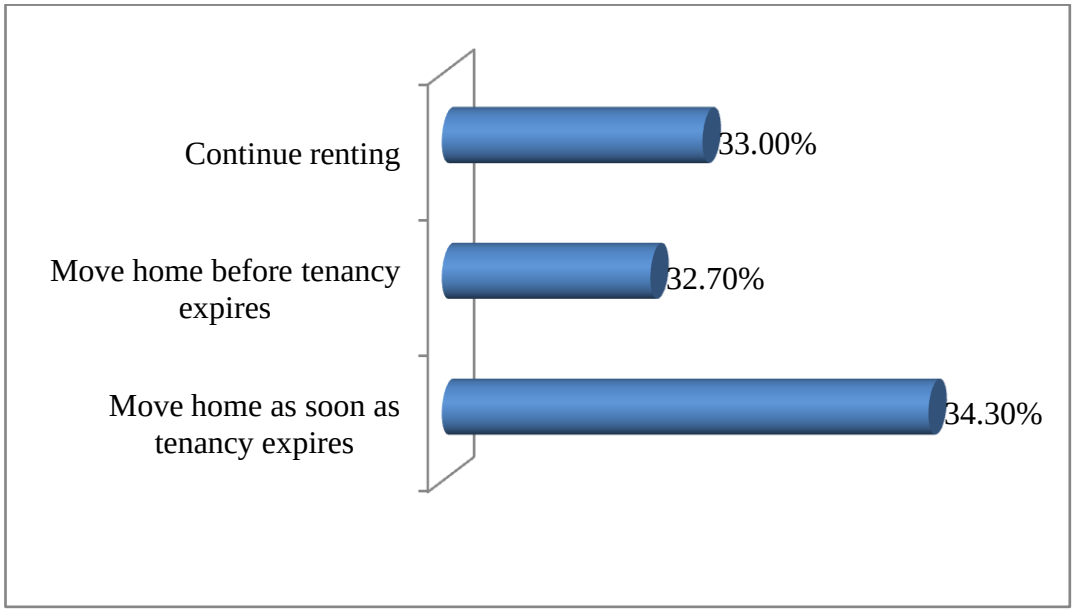


Figure 7.6: Respondents' Reactions to the Location of Graves within Current Homes

7.7.3 Intention to Move Home and Reaction to the Location of a Grave within a Property

Tolerance to the externalities of graves is assessed among respondents who are moving home at their own free volition within the next year relative to the time of conducting this survey. The emerging discussion emanates from two rational assumptions derived from tenants' intention to move home within the next year or otherwise and reaction to graves in current homes (see Table 7.17 for details). Firstly, tenants who are with the intention of moving home within the next year are either not satisfied with their current accommodation or moving to owner occupied homes. Out of the group of respondents with the intention of moving home within the next year, the analysis reveals that if a grave were suddenly located in their homes, 29.8 percent of them would move home earlier than scheduled to avoid the effect of the grave. Similarly, 30.9 percent of this group of respondents would move home as soon as their tenancies expire. However, 39.2 percent of those who are

planning to move home within the next year would continue occupation of the grave impacted property until the proposed moving date.

Secondly, tenants who are without the intention to move home within the next year are satisfied with their current housing choice and location. The group of respondents who satisfy this assumption represents 40 percent of the population sample. Out of this, the analysis shows that 23.5 percent of the respondents would continue occupation of a property with a grave. Conversely, 39.5 percent would move away from the grave impacted home as soon as their tenancies expire. Similarly, the analysis shows that 37.0 percent would move home before expiration of their tenancies if a grave were suddenly located in their current home. In effect, 66.5 percent of the tenants will be displaced from their current homes if a grave is located within their accommodation.

Table 7.17: Cross-Tabulation of the Possibility of Moving Home within the next Year and Reaction to a Grave Impacted Property

Responses	Moving home within the next year	
	Yes (%)	No (%)
Move home as soon as tenancy expires	30.90	39.50
Move home before tenancy expires	29.80	37.00
Would continue to rent	39.20	23.50
Total	100.00	100.00

7.7.4 Duration of Residence in Current Apartment and Reaction to Properties with Graves

The analysis shows that 79.6 and 63.3 percent of the respondents who have lived in their present accommodation for short period (1 to 5 years) would move home as soon as their tenancy expires and before their tenancy expires respectively. The percentage of tenants that would move home in response to the location of graves in their current homes decreases as the length of stay in the current home increases (see table 7.7 for details). The implication of this finding is that tenants would move home more often against their will in order to avoid the negative externalities of

graves. As accommodation are often let in unfurnished state in the study area, this often results in damage to furniture which often happens due to breakage in moving households properties from one point to another.

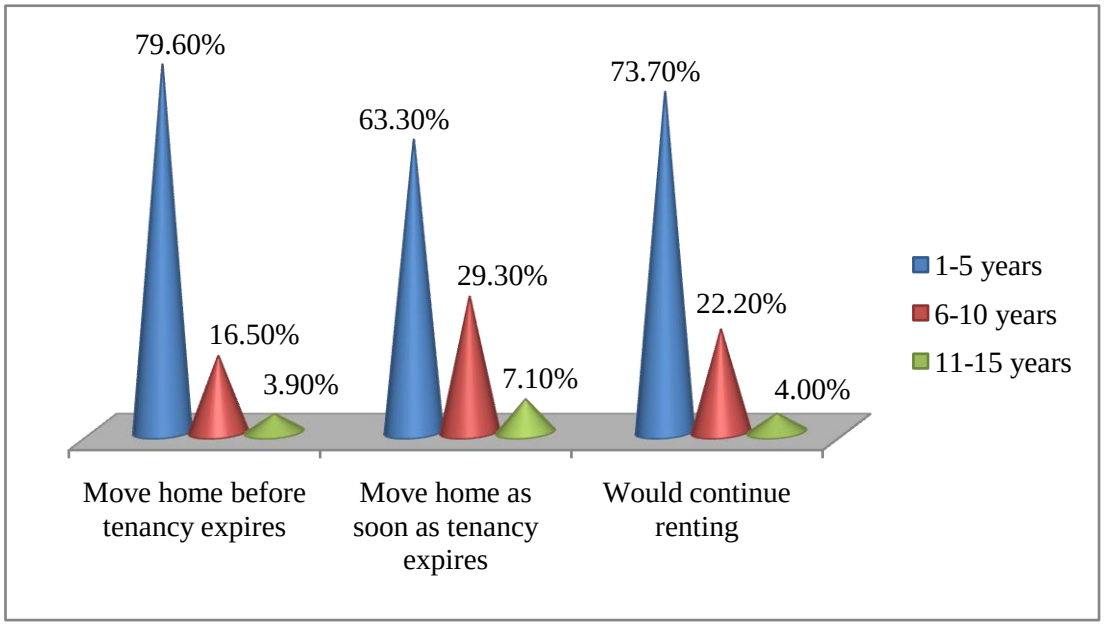


Figure 7.7: Tenants' Duration of Residence in Current Homes and Reaction to the Location of a Grave within them

7.8 Income Effects and the Chances of Renting a Property with a Grave

Further investigation on the tenants' reactions to a sudden location of a grave in their current homes is carried out to discover the possible income effects on residential choices across the three categories of income group represented in the survey (see figure 7.8). Firstly, the analysis shows that 34.50 percent of the high-income earners would move home as soon as their current leases expire. However, 51.72 percent (representing more than half of the high-income earners) would move home before their current leases expire. Only 13.80 percent of the respondents would continue occupation of homes with graves for as long as they wish to stay. In all, the analysis reveals that 86.2 percent of the high-income earners would move home to avoid a residential property with a grave.

Secondly, the analysis shows that 41.70 percent of the middle-income tenants would move home as soon as their tenancies expire while 31.70 percent would move home before the expiration of their current tenancy period. In total, 73.4 percent of the middle-income tenants would move home from a residential property with a grave.

Nevertheless, the lowest percentage of this group, approximately 26.62 percent would like to continue their tenancy regardless of the location of a grave in their current rented residence.

Thirdly, the analysis of respondents' opinion among the low-income group shows a reverse order of the magnitude of response options compared to high income and middle-income respondents. The findings show that only 26.50 percent of the respondents would move from their current dwelling after the expiration of their current leases due to the location of a grave in the building, while 29.50 percent would move home before the expiration of their tenancy period. Altogether, analysis shows barely 50 percent of the low income earners would move home from a residential property with a grave. However, 43.90 percent (representing nearly half of the low-income tenants) signify interest to continue occupation of the current home despite the location of a grave within it.

Inferences from the analysis show that low-income earners are more constrained to properties with graves. Although the immediate reason for this reaction is unknown, the reaction of the respondents is consistent with previous findings from Li et al. (2011) and other studies that households with low income tend to demand residential properties with lower quality while high-income households tend to choose properties with higher quality.

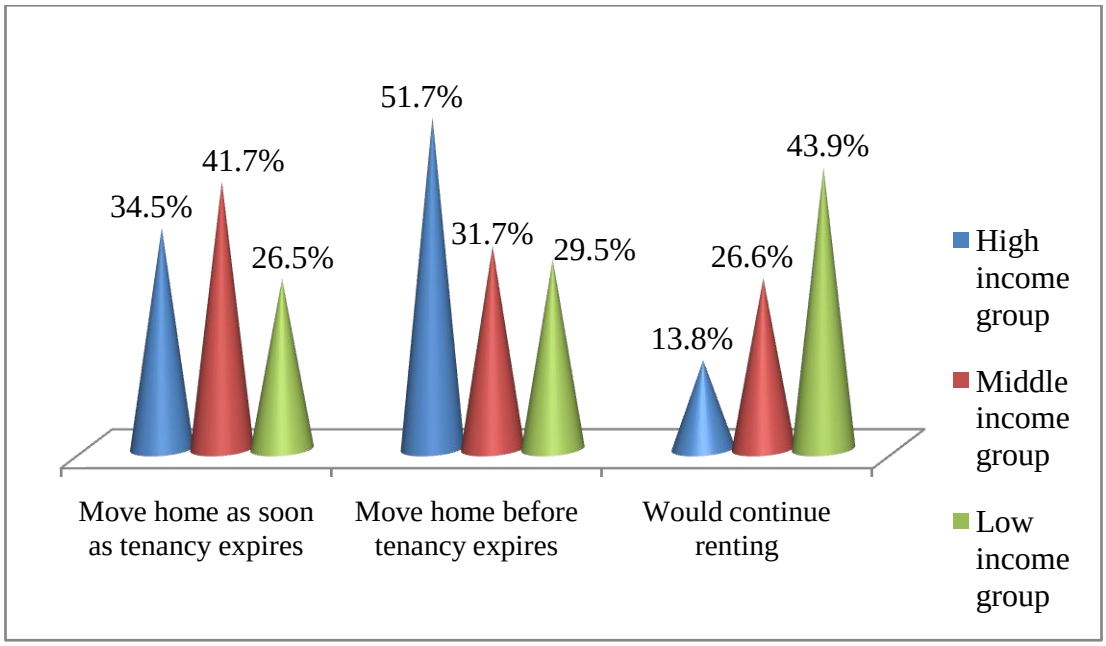


Figure 7.8: Reaction to Negative Externalities among Different Income Groups

7.9 Impact of Education on the Respondents Reactions to the Location of Graves in Residential Properties

As shown in Table 7.18, analysis reveals that 100 percent of respondents without formal education would move homes from properties with graves before the expiration of their tenancy periods. While this is surprising, it could be because only a few people without any form of formal education are represented in the survey. The Table shows that as the level of education rises, the percentage of people who would continue occupation of a grave impacted property progressively declines. For instance, while 54.50 percent of respondents with primary education would continue to rent property with a grave, it decreases to 52.90 percent among respondents with secondary education. In addition to this, 41.00 percent of the respondents with college education would continue with their tenancies in properties with graves while only 26.40 of respondents with university education would do so. Similarly, only 11.50 percent of respondents with postgraduate education would continue tenancy in a property with grave.

Concerning the tendency to move home before the tenancy expires to avoid the externality of a grave, the analysis reveals a similar line of thought across the respondents. Table 7.18 shows that 18.20 percent of respondents with primary education would move home before their tenancies expire. This value increases to 19.60 percent among secondary school certificate holders and 23.10 percent among respondents with college education. Respondents with bachelors' and postgraduate degrees demonstrate similar residential choice behaviour, with 40.60 and 44.20 percent respectively ready to move homes from properties with graves before their tenancies expire. For respondents who react to the location of a grave in their current residences by moving homes after the expiration of their current tenancies, a similar direct proportional relationship between probability of moving and the level of education manifests. However, the percentage of respondents who would move homes as soon as their tenancies expire rises once again to 44.20 percent among respondents with postgraduate education. An examination of the relationship between willingness to continue occupation of a residential property with a grave and respondents' educational level does not clearly reveal preference for a distinct line of thought among respondents with higher or lower levels of education.

Table 7.18: Respondents' Level of Education and Reaction to Negative Externalities of Graves in Residential Properties

Educational Qualifications	Move home as soon as tenancy expires	Move home before tenancy expires	Continue to rent the property
Nil	--	100.00	--
Pry School Cert.	27.30	18.20	54.50
SS Cert.	27.50	19.60	52.90
NCE/OND	35.90	23.10	41.00
BSc./HND	33.30	40.60	26.40
Postgraduate Cert.	44.20	44.20	11.50
Total	34.30%	32.70%	33.00%

Source: Author's Fieldwork (May-July, 2013)

7.10 Suitability of Residential Properties and Reaction to Negative Externalities of Graves

The study assesses respondents' current residential locations to examine the trade off they would make between an externality of a grave and the best residential location for daily activities. Firstly, analysis reveals that 69.30 percent of the respondents consider their current residential location as best for their daily activities (see Table 7.15). Out of the respondents whose current choice of dwellings best suit daily activities, Figure 7.9 shows that 31.30 and 32.70 percent would move home before expiration and after expiration of their tenancies respectively to avoid the externality of a grave. However, 36.10 percent would continue occupation of their present homes irrespective of the location of grave within them. The implication of this unplanned home movement is that 63.94 percent of homes with graves would be vacant possibly in the short run. With the attendant letting risk, it may transmute to long-term vacancy period and loss in rentals. Secondly, 30.67 percent says they are currently not in the best location that suits their daily activities. Consequently, 33.70

percent would move home before their tenancy expires while 34.00 percent would move after expiration of their current tenancy periods. However, 24.20 percent would continue to occupy properties with graves due to other undisclosed reasons and despite its locational disadvantage for their daily activities.

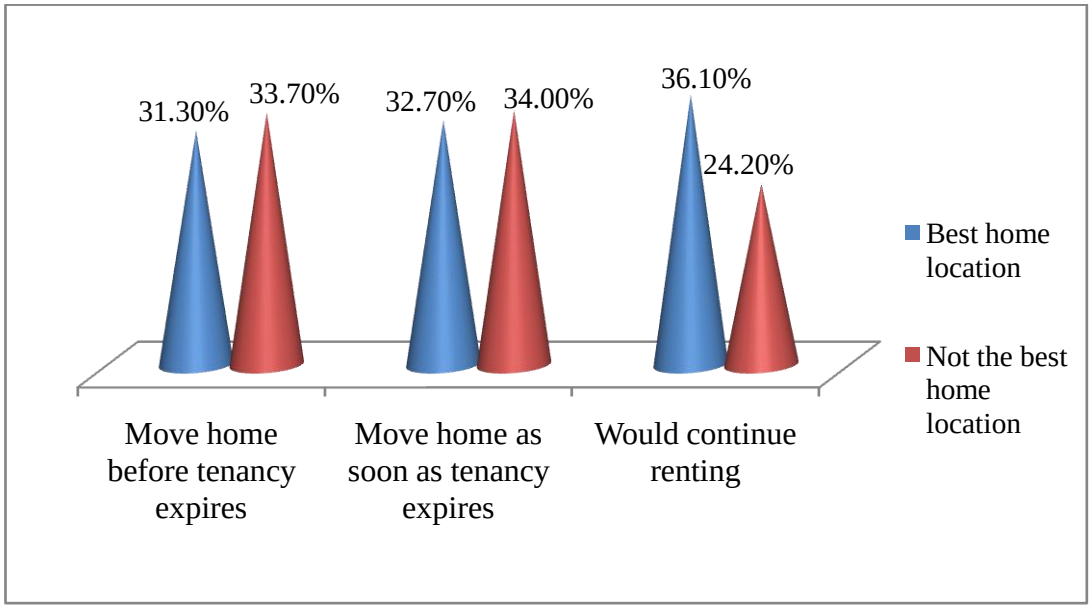


Figure 7.9: Cross-Tabulation of Suitability of Respondents' Residential Location and Reaction to the Location of Graves within Properties

7.11 Size Influence on Home Choice Decision Makings and Reactions to Properties with Graves

This sub-section examines the influence of number of home choice makers and their reactions to a sudden location of a grave on their current residential properties. The analysis is shown in Table 7.19. The Table shows that 31.7 percent among the single decision makers and 35.6 percent of those taking home choice decisions with their wives would move home before their tenancies expire. Conversely, only 26.9 percent of the respondents taking home decision with their wives and children would move home before the expiration of their tenancies to avoid the negative externalities of graves. Similarly, 33.3 percent of the female households who involve their husbands in home choice decision would move home before their current tenancies expire.

For tenants who decide to continue renting in the event of a sudden location of a grave within their current homes, those who take home choice decisions alone represent 31.7 percent. Furthermore, Men who take home choice decisions with their

wives represent 37.9 percent. However, the inclusion of children into the home choice decision reduces the percentage of those that would continue to rent a grave impacted home to 30.8 percent. Where a female head of household takes a home choice decision with her husband, only 6.7 percent would continue to rent their current homes if a grave is suddenly located in it. It is realised here that the magnitude of the number of choice decision makers in a family does not produce a logical conclusion that the higher the number of home choice decision makers the higher the possibility to avoid homes with graves. This could be due to dissenting opinions and heterogeneity of the perception of individuals involved in home choice decision. In all, the analysis of data presented in Table 7.19 shows that home choice decisions are not often a decision solely made by the head of households.

Table 7.19: Numbers of Residential Choice Decision Makers and Reaction to the Location of a Grave on Current Home

Decision Makers	Move home as soon as tenancy expires (%)	Move home before tenancy expires (%)	Continue to rent (%)
Just me	36.60	31.70	31.70
Self and wife	26.50	35.60	37.90
Self, wife & children	42.30	26.90	30.80
Self and Husband	60.00	33.30	6.70
Total	34.30%	32.70%	33.00%

Source: Author's Fieldwork (May-July, 2013)

7.12 Impact of Family Size on Reaction to Property with a Grave

Figure 7.10 provides information on the impact of family size on respondents' reactions to the location of graves within residential properties. The analysis reveals that respondents with a relative small family size (one to three people) would easily move home to avoid the negative externality of a grave. Among the three possible respondents' reactions to the location of a grave on residential properties from this group, it was discovered that 34.60 and 36.70 percent of them would move home as

soon as their tenancies expire and before their tenancies expire respectively. Only 28.70 percent would continue their tenancies in a residential property impacted by a grave.

For a medium size family comprising of four to six people, the majority of them representing 39.40 percent would continue to rent properties with a grave while 35.60 percent would move home after the expiration of their current tenancies; however, only 25.00 percent would move homes before their tenancies expire. Conversely, respondents with a large family sizes (seven and nine people) tend to behave in the reverse order when compared to respondents with small and medium family sizes. The study reveals that 50 percent of the respondents would continue to rent residential properties with graves. Largely, this opinion is a reflection of their size, which may slow down the decision to move homes in consideration of every member of the family. Similarly, the analysis reveals that, 37.50 percent of the tenants with a large family would move homes before their tenancies expire while 12.50 percent are willing to move home after the expiration of their current lease.

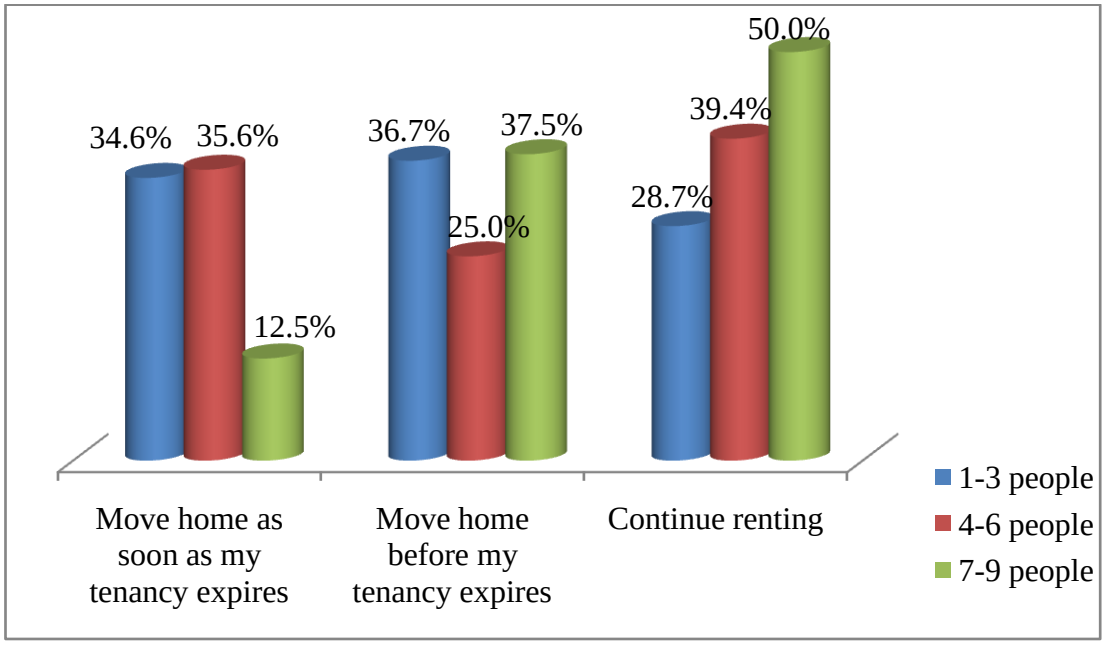


Figure 7.10: Reaction to Externalities of Grave and Family Size Crosstab

7.12.1 Cross-tabulation of Tenants' Age and Reactions to a Home with a Grave

The analysis of data shown in Figure 7.10 shows that the percentages of the respondents who are of the opinion that any location should be used for a grave are almost even among respondents that are up to 49 years old. The opinion is more

popular among tenants that are up to 57 years old, but not acceptable to tenants above this age. Similarly, the analysis shows that there is no clear influence of age (up to 57 years) on an indifferent attitude to the location of a grave on a residential property. However, none of the tenants that are above 57 years old is indifferent to it. Furthermore, concerning those who do not support the location of a grave within a home, the analysis reveals that tenants across different age groups show a consistent pattern of opinion. The majority of the tenants in each category are not in support of the location of a grave in a residential property. Conversely, only 10 percent of the tenants that are up to 25 years old support the practice. This opinion diminishes to 2.30 percent among tenants that are up to 33 years old and tails-off among those between 34 and 57 years old. Surprisingly, 25 percent of the tenants who are above 57 years old support the location of a grave within a residential property.

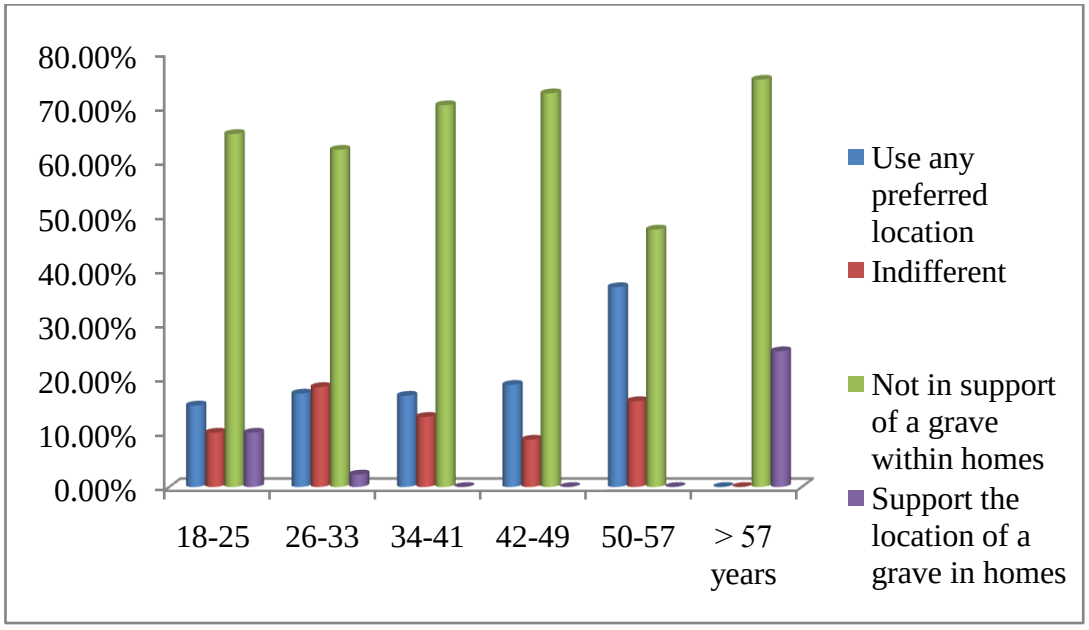


Figure 7.11: Respondents' Opinion on Grave's Location by Age Groups

7.13 Non Parametric Test of Hypotheses Using Chi-Square Statistics

In view of the fact that negative externalities on properties are perceived to have varying significance among different respondents, this section addresses whether or not some covariates have significant effects on the possibility of renting a residential property with a grave. In all, four hypotheses are stated and tested. The first are two hypothesized on the rationality that tenants often tend to rent accommodation in a location that best suits their daily activities subject to a budget constraint (income).

The third and fourth hypotheses are stated to reflect the influence of family size and education on respondents' reaction to residential properties with graves. The hypotheses are stated below and tested using Pearson Chi-square in subsection 7.13.1 to 7.13.4.

Hypotheses

H_{01}: Suitability of a residential location for daily activities has no significant relationship with renting a property with a grave.

H_{02}: Income has no significant relationship with the desire to continue occupation of a residential property with a grave.

H_{03}: Family size has no significant influence on the possibility of continuing a tenancy in a residential property with a grave.

H_{04}: Education has no significant relationship on the possibility of residing in property with a grave.

7.13.1 Hypothesis 1 (H_{01})

H_{01}: Suitability of a residential property's location for daily activities has no significant relationship with renting a property with a grave.

X^2 =2.87
Critical value= 5.99
α= 0.05

Decision rule: Reject null hypothesis if X^2 is greater than critical value

Table 7.20 shows that X^2 value is lower than the critical value at 0.05 significance level and 2 degrees of freedom. The asymptotic significance shows a value greater than the α (0.05). Therefore, the null hypothesis is accepted, implying that there is no significance relationship between suitability of a residential location and the choice of renting a residential property with a grave. Any observed relationship between the two variables is due to chance occurrence. Section 7.10 discusses the specific influence of a residential location on tenants' choices if grave were suddenly located in their current homes.

Table 7.20: Chi-Square Test for Significance Relationship between Location's Suitability and Home Movement due to Negative Externality of Grave

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.870[a]	2	.238
Likelihood Ratio	2.940	2	.230
Linear-by-Linear Association	2.217	1	.136
N of Valid Cases	300		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 30.05.

7.13.2 Hypothesis 2 (H_{02})

Income has no significant relationship with the desire to continue a tenancy in a residential property with a grave.

$X^2 = 17.96$

Critical value= 9.47

$\alpha = 0.05$

P value= 95%

Decision rule: Reject null hypothesis if X^2 > critical value

Table 7.21 shows that the X^2 (17.96) is greater than the critical value (9.47) and the asymptotic significance (0.001) is less than the alpha value at 0.05 significant levels. Based on the decision rule, the null hypothesis is rejected while the alternative hypothesis is accepted. It is therefore inferred that income has a significant relationship with desire to continue occupation of a residential property with a grave The level of significance shows that the relationship between income and the possibility of renting a residential property with a grave is more than 95 percent mere chance occurrence.

Table 7.21: Chi-Square Result for Significant Relationship between Respondent Income and Reaction to a Negative Externality of a Grave.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.96[a]	4	.001
Likelihood Ratio	18.136	4	.001
Linear-by-Linear Association	10.872	1	.001
N of Valid Cases	300		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.47.

7.13.3 Hypothesis 3 (H_{03})

H_{03}: Family size has no significant impact on the possibility of moving a home to avoid residential properties with graves.

$$X^2 = 7.069$$

Critical value= 5.99

$$\alpha = 0.05$$

P Value= 95%

Table 7.22 shows that the chi-square value (7.069) is greater than the critical value (5.99) at 4 degrees of freedom and 0.05 alpha. Therefore, the null hypothesis is rejected while the alternative hypothesis is accepted. This implies that family size has a significant impact on respondents' reaction to a sudden location of a grave in their rented residential properties. Figure 7.10 (see p 153) shows that 50 percent of the respondents with seven to nine would continue to rent their current properties though impacted by graves. Conversely, a majority of the respondents with a population of between one and three people would move homes before their tenancies expire to avoid the effects of graves on their current dwelling.

Table 7.22: Chi-square Test for Significance Relationship between Family Size and Reaction to a Grave

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.069[a]	4	.132
Likelihood Ratio	7.433	4	.115
Linear-by-Linear Association	2.264	1	.132
N of Valid Cases	300		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 2.61.

7.13.4 Hypothesis 4(H_{04})

H_{04}: Education has no significant relationship with the possibility of continuing a tenancy in a property with a grave.

$X^2 = 34.16$

Critical value= 25.2

$\alpha = 0.05$

P Value= 95%

Table 7.23 shows that the chi-square value (34.16) is greater than the critical value (25.2) at 10 degree of freedom and 0.05 alpha. Similarly, the asymptotic significance also reveals a value (0.00) which is lower than the alpha value (0.05). Therefore, the null hypothesis is rejected; this implies that the level of education of respondents has a significance relationship with the decision to continue occupation of a residential property with a grave. While the level of education has a significant effect on tenants' residential choice, the specific influence is unknown. However, section 7.9 discusses this in details from the results of the cross-tabulation of education and reactions to sudden location of graves in the respondents' current homes.

Table 7.23: Chi-square Test for Significance Relationship between Education and Reaction to a Property with a Grave

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	34.163[a]	10	.000
Likelihood Ratio	36.160	10	.000
Linear-by-Linear Association	13.587	1	.000
N of Valid Cases	300		

a. 6 cells (33.3%) have expected count less than 5. The minimum expected count is .65.

7.14 Presentation and Analysis of Qualitative Data

The data analysed here emerged from two sources. The first includes secondary data source such as published materials (state gazette). This data source provides information on the position of the law concerning the location of a grave within a residential property (see sub-section 7.14.1. for details). The second is primary data collected through structured interviews. The interviews were motivated by the need to have a better understanding of the modus operandi of the Environmental Health Officers and their challenges in Akure (see sub-section 7.14.2 for detail analysis).

7.14.1 Legal Provision against the Location of Graves in Residential Properties

The legislation that prohibits the location of a grave in residential properties falls under the public health law in Nigeria. It is promulgated as a National law; the manifestation in Akure and other States is simply a derivative of the national law with little or no amendments. According to the National Health practice regulations 2007 Section 12 (2):

> *Dead bodies shall be sanitarily disposed off or buried only in a place approved by the environmental Health Authority in charge of the area*

From a sound judgement, the above provision at the national level implies that the approved place for graves shall be in graveyards. However, it raises questions on the alternative locations outside graveyards deemed fit by the Environmental Health Authority.

With reference to Akure, Section 3 of the Ondo State Burial on Private Premises Law Cap 124 Vol.3 of the public health byelaw stipulates that:

> "*No corpse shall be buried on any private premises unless the disease was by customary law entitled to be buried thereon and the person responsible for burying the corpse has obtained a written authorization from a Health Officer for the burial of the corpse.*

Similarly, Part III, Section 5 of the Ondo State Local Government Bye-Law 3 of 2003 provides as follows:

> *No Person shall attempt to bury or bury a deceased person in a private home except the approval of the Council is obtained before embarking on such burial.*

Any contravention of this provision is seen as a criminal offence against public health and punishable by law under the Criminal Code Act Cap.77, Section 246 laws of the Federation of Nigeria (L.F.N) 2004. It states that:

> *Any person who buries or attempts to bury a deceased person in any house, building, premises, yard or garden, compound, or within a hundred yard of any dwelling house or any open space situated within a township without the consent of the president or the Governor is guilty of a misdemeanour, and liable to six month imprisonment.*

Sub section 7.14.2 discusses the implication of the law on the negative externality of a grave in residential properties in Akure.

7.14.2 Analysis of Qualitative Data Collected from Interview

The qualitative data collected from the Environmental Health Office is based on three specific questions. The responses to the questions are as reported below.

The first question focuses on the position of the law regarding the location of a grave on private premises in Akure. By the provision of the law, the location of a grave outside the approved location constitutes a statutory nuisance. It is a criminal offence punishable under the Burial on Private Premises Law Cap 124 Vol.3.

Having discovered the legal provision that prohibits the location of a grave in a home the interview progressed to seek information on its' effectiveness in Akure. The effectiveness of the law suffers a major dent by a proviso to bury a corpse on private home subject to the Governor's approval. It is obvious that the general provision of burial on a private home law is weak and not efficient enough to eliminate a land use practice that portends danger to public health, property value and social welfare. Despite the proviso that allows for the location of a grave on private premise, people seldom seek permission to do it on any part of a residential property. Does that mean customary law permits all the graves located on private premises? While this is unacceptable, the law is silent on the specific group of people permitted to locate grave on private premises.

Irrespective of the exceptions in the law, the third question asked in the interview sought to know the constraints hindering the enforcement of the Burial on Private home Legislation in Akure. Although the law is somewhat defective, the major constraint to the enforcement of its relevant provision is twofold. First, inadequacy of human resource; only 12 Health officers (consisting of the Head of Department and Field Officer) are employed to enforce the public health law in Akure with over 450,000 people. Field officers who should facilitate the compliance are very few. Similarly, there is no insurance cover for field officers to indemnify against any risk suffered on the field. As a result, the intervention to ensure compliance with the law often arises when an aggrieved party complains. For instance, one of the recent cases arises from a complaint of the owner of an adjoining property abutting a property proposed for the internment of a corpse. The complaint was borne out of the fact that the location of the grave is very close to the adjoining building Owner's well (the source domestic water for the aggrieved party). Despite warnings of the potential threat of such proposal, the grave was located very to the well. This could have spelt trouble for a field officer that would have attempted to stop the aggrieved bereaved from burying the remains of their loved one on the private residence.

Second, inadequate cemeteries in Akure hamper the enforcement of compliance with the burial on private premises. A thought provoking question any member of the public may ask is that if the location of a grave is prohibited on private premises, what alternative location has the public authority provided? Presently, Akure has only one public cemetery and it is not open to the public. Burial on the cemetery is the exclusive preserve of deceased insane persons, people that died of HIV and AIDS and other socially stigmatized diseases. Regrettably, the site is largely unkempt, unsecure and open to intruders who mutilate bodies for rituals. With the general state of the available public cemetery and even if it is open to public, people consider it as a place for the hated and unloved not worth remembering. The majority of the cemeteries in Akure belong to religious organisations such as Churches and mosques. Non-members of the religious bodies are restricted from usage of the cemeteries, while the majority of them are filled up. According to the interviewee, w*e have written proposals to the government asking for more cemeteries but no response.*

7.15 Conclusion

In conclusion, this chapter presents analysis of the descriptive data that are crucial to the two of the research objectives. The first one gave an insight on the possible residential choice of the respondents while the second addresses the legal implications of the location of graves on residential properties. The next chapter analyse respondents' residential stated choice. It presents the analysis of parametric data on tenants' residential choice and WTP.

Chapter 8
Presentation and Analysis of Stated Choice Data

8.1 Introduction

Chapter 7 presents an analysis of the descriptive data with specific focus on tenants' perception and reactions to a residential property with a grave. The chapter provides a simple assessment of the impact of a grave on tenants' residential choice and rent. However, the findings from such analysis are not always sufficient where parameter estimates require absolute precision. Therefore, this chapter presents and analyse the stated choice data using two rigorous statistical tools for parameter estimation. The chapter is divided into thirteen sections. It starts with the use of MNL as a top-line diagnostic tool for aggregate estimation of main effects in section 8.2. It validates the reliability of the MNL parameter estimates in section 8.3. In order to overcome the limitation of the model, it applies Hierarchical Bayes (HB) model to estimate average utilities for the parameters in section 8.4. It appraises the average importance of the contribution of each variable to the choice process in section 8.5. Sections 8.6 dwell on the validation of the HB model's estimates. Section 8.7 to 8.11 analyse tenants' sensitivities to rent discounts in residential properties with graves. The sections examine the elasticity of demand to a change in rent on residential property with a grave in four different parts (frontage, side, backyard and room). In section 8.12, the chapter presents a model for a tenant's choice under the negative externality of grave. Section 8.13 presents a capstone the chapter.

8.2 Multinomial Logit Model (MNL) Results for Estimated Parameter

The MNL model is applied as the basic top-line diagnostic tool for parameter estimation. The result of each variable level is presented in the form of effects. This is similar to the utility assigned on variable level estimates in the HB model. For a best fit of the logit estimates, Orme (2006) advises the inclusion of a number of variable interactions in the model but with a caution to prevent over-fitting. For this study, the logit estimate shows little improvement on the root likelihood (RLH) with the addition of one interaction (rent and grave variables).

8.2.1 Estimated Willingness to Pay (WTP)

The aggregate estimation of the main effect on rent parameters by the MNL is shown in Table 8.1. The analysis shows that a 20 percent rent discount for a residential property with a grave has the highest utility with an effect of 0.59618. A 0.37995 effect obtained on WTP a 15 percent discount less than the market rent for residential property with a grave follows this. Next to this is an effect of 0.15751 obtained for a 10 percent discount, while the lowest utility -0.3637 is obtained on a 5 percent discount. The implications of these parameter estimates on WTP reveals that a 5 percent rent discount is largely unattractive while a 10 percent discount is barely enough to encourage respondents to rent a residential property with a grave. A 10 percent increase above the market rent produces a negative effect of -0.76988. This implies that paying a 10 percent premium above the market rent on a residential property without a grave or deficiency in other residential attributes is not attractive to the respondents. This variable level shows a similar characteristic with a 5 percent rent discount, however, the value of the effect obtained on the former is lower than the latter. The difference in the variable levels suggests that more people would rather continue to reside in properties with graves rather than paying 10 percent above the market rent on similar properties without graves or deficiency in other attributes. In sum, the estimated effects reveal that respondents' WTP for a residential property with a grave ranges between a 15% and 20% reduction in the full rental value of a residential property without a grave.

Table 8.1: Utility Estimate for WTP

Variable Levels	Effect	Std. Error	T Ratio
5% rent discount	-0.36376	0.12831	-2.83510
10% rent discount	0.15751	0.07313	2.15389
15% rent discount	0.37995	0.07237	5.25010
20% rent discount	0.59618	0.06663	8.94747
10% increase in rent	-0.76988	0.10419	-7.38917

8.2.2 Parameter Estimates for Graves' Main-Effects

In a similar fashion with the rent variable, five parameters estimates emerged from the grave variable. As shown in Table 8.2, the model estimates show that a residential property without a grave has the highest effects with a value of 1.97255. This implies that most tenants prefer to rent a residential property without a grave. Among the residential properties with a grave, those with it at the backyard produce the highest value, this represents 0.11768 effects. A residential property with a grave at the frontage follows this with an effect of -0.18372. This implies that respondents are somewhat tolerant to renting residential properties with graves at the frontage. Residential property with a grave at the side produces an effect of -0.25786 and less attractive than properties with graves at the frontage. Similarly, a property with a grave within the room has -1.64865 effects and the highest parameter estimate with a negative value. The value is as high as the main effect estimates for a residential property without a grave in absolute terms. In a zero centred part-worth model estimate, the analysis implies that the magnitude of dissatisfaction on a residential property with a grave in a room is nearly at par with the level of possible satisfaction on a similar property without a grave. The corresponding negative effect on a property with a grave in room and other variable levels could be due to the duration of exposure to the grave. Most tenants spend more time in their room, front of the house and at the rear than the sides, thus, explaining the possible rationale behind declining level effect in that order. The low standard errors assigned on the variable levels confirm the precision of the estimated effects as shown in table 8.2.

Table 8.2 : Estimated Main Effects for Grave's Attribute

Variable Level	Effects	Std. error	T Ratio
Grave at the frontage of the building	-0.18372	0.07435	-2.47099
Grave besides the building	-0.25786	0.07599	-3.39341
Grave in the backyard	0.11768	0.06897	1.70638
Grave within the room	-1.64865	0.15046	-10.95777
No grave	1.97255	0.05906	33.39739

8.2.3 Building Services

The estimated parameters for buildings services in Table 8.3 reveal that respondents generally prefer a residential property with a 24 hours supply of electricity and water. It produces 0.20515 effects and the highest positive effect among all the other attributes level. A residential Property with 24 hours electricity supply and 8 hours of water supply produces an effect of 0.14269 and next to the most preferred attribute's level. A property with 8 hours of electricity supply and water supply represents -0.19534 effects and the least attractive of all. A property with 8 hours of electricity supply per day and constant water supply per day produces -0.15250 effects. A careful analysis of these effects shows that respondents place more priority on power supply than water supply.

Table 8.3: Estimated Main-Effects for Building Services

Variable Levels	Effects	Std. error	T Ratio
24 hours electricity and water supply.	0.20515	0.04999	4.10408
8 hours of electricity and water supply per day	-0.19534	0.05249	-3.72154
24 hours of electricity and 8 hours of water supply per day	0.14269	0.05005	2.85064
8 hours electricity and 24 hours of water supply per day.	-0.15250	0.05439	-2.80383

8.2.4 Parameter Estimates for Space and Fencing

The estimated data is as shown in table 8.4. The logit analysis reveals that a residential property with large compound but without a fence as well as another with small compound without a fence both produces negative effects. While the former generates -0.22134 effects the latter has -0.10930 effects. It implies that respondents do not generally prefer a residential property with a large compound but without a fence. Surprisingly, a residential property with a small compound but fenced generates a negative effect. The immediate reason for this is unknown, however, an inference emerges relative to the first variable level discussed above. It suggests that a fence may be ideal for a residential property with large compound; a fenced

residential property with small compound in a tropical city with irregular power supply is generally not attractive. Furthermore, a property with a large compound and a fence seems to be an ideal property for the respondents as it produces a positive effect value of 0.18113. It represents the highest value obtained among all the estimated main effects under this attribute. Similarly, a positive effect of 0.14950 is obtained on a residential property with a small compound without a fence. Contrary to the negative effect observed on a property with a small compound and a fence, all things being equal, respondents perhaps see no reason to fence a property with a small compound. The need to facilitate natural ventilation within the property's internal environment in a city without stable power supply may account for such occurrence.

Table 8.4: Estimated Main-Effects for Compound Size and Fencing

Variable Levels	Effects	Std. Error	T. Ratio
Large compound with no fence	-0.22134	0.05346	-4.14051
Large compound with fence	0.18113	0.04877	3.71371
Small compound with fence	-0.10930	0.05276	-2.07171
Small compound with no fence	0.14950	0.04952	3.01895

8.2.5 Accessibility to Work and Local Services

Four parameters are estimated under this attribute as shown in table 8.5. A residential property located within the point of highest accessibility of not more than 15 minutes by bus to work and local services is most attractive; it accounts for an effect of 0.04243. Next to this is the property located within 15 minutes to local services and 30 minutes to work which represents 0.08769 effects. However, a residential property accessible within 15 and 30 minutes relative to working place and local services respectively produces 0.00651 effects. This implies that respondents place more priority on accessibility to local services than work. A residential property that is remotely located within 30 minutes by bus to work and local services is generally not attractive as it produces an effect of -0.13662 which is thrice the value produced by all other levels' effect. The logit analysis estimation of

the four levels for this attribute shows that accessibility is an important consideration as all but one level of the attribute shows a negative value effect.

Table 8.5: Estimated Effect for Accessibility

Variable Levels	Effects	Std. Error	T. Ratio
15 minutes by bus to work and local services	0.04243	0.05130	0.82711
30 minutes bus to work and local services	-0.13662	0.05218	-2s.61819
15 minutes to work and 30 minutes to local services by bus	0.00651	0.05131	0.12677
15 minutes to local services and 30 minutes to work by bus	0.08769	0.04993	1.75612

8.2.6 Room Sizes and Ventilation

The logit analysis estimates in table 8.6 shows that a property with double bed size room and cross ventilation produces 0.43283 effects; however, a single room with cross ventilation produces 0.01034 effects. A double bed size room without cross ventilation produces a lower effect of 0.00943. The huge reduction in the value of effect obtained in this attribute's level and the former two shows that cross ventilation is more important than a bedroom's size. This finding is further strengthened by a massive negative effect -0.45260 obtained on a single bedroom without cross ventilation. Parameter estimates display effects that both room size and ventilation are important residential property choice determinants. This implies that a property with a single bedroom without cross ventilation is three times dissatisfying compared to a property with cross ventilation irrespective of the bedroom's size.

Table 8.6: Estimated Effects for Room Size and Ventilation

Variable Levels	Effects	Std. error	T.Ratio.
Double bed size room(s) and (100 sq ft), with cross ventilation	0.43283	0.04866	8.89529
Double bed size room(s) and (100 sq ft,) with no cross ventilation	0.00943	0.04993	0.18889
Single bedroom(s)(70 sq ft),cross ventilation	0.01034	0.05217	0.19821
Single bed size room(s) (70 sq ft),no ventilation	-0.45260	0.05610	-8.06778

8.3 Validation of MNL Model Parameter Estimates

According to Paez (2009), model validation is a process of comparing the predictions from a mathematical model of a system with the measured behaviour of the system. This section attempts to determine the accuracy and degree to which the MNL model estimates (in section 8.2) fit the stated choice data. To validate the MNL model estimates, the logit analysis employs the values used by Sawtooth software which rarely needs to be changed for computation purposes. The software is set to a default value of 100 as the maximum number of iterations for any logit analysis before model convergence. However, as shown in Table 8.7 below, the estimation requires only seven iterations for model convergence. Having achieved model convergence, the model is evaluated using chi-square statistics to determine a null log likelihood of -4158.88 with reference to the sample size and the data if the estimated effects were all zero. This is compared to log likelihood value -3054.8190 obtained for the model which gives a difference of 1104.0641.Two times the difference value is obtained as the chi-square "2208.1281" of the data. The model estimated 19 main- effects, and with this number set as the degree of freedom; a chi-square of 30.14 would be significant at 0.05 confidence level. The value obtained "2208.1281" is absolutely higher than this, consequently, it is inferred that respondent choices are significantly influenced by composition of attributes in the choice concept. Similarly, as shown in table, the root log likelihood (RLH) obtained

across all the iterations are higher than 0.2500 RLH expected in a worst-case scenario for reliability of model prediction.

Table 8.7: Log-likelihood and Root Likelihood for Logit Estimates

Iteration	Log-likelihood (χ2)	RLH
1	2027.33697	0.35050
2	2192.25327	0.36026
3	2206.35351	0.36111
4	2208.03780	0.36121
5	2208.12745	0.36122
6	2208.12810	0.36122
7	2208.12810	0.36122
Log-likelihood for this model	-3054.81903	
Log-likelihood for null model	-4158.88308	
Difference	1104.06405	
Percent Certainty	26.54713	
Chi-Square	2208.12810	
Relative Chi-Square	59.67914	

Source: Logit estimation of CBC data

8.4 Hierarchical Bayesian (HB) Estimation of Attributes' Utilities

As stated earlier, the multinomial logit model serves as a basic top line diagnostic tool for aggregate estimation of the main effects. In order to overcome its inherent IIA shortcoming commonly known as the red ball and blue ball problem, Hierarchical Bayes model is applied. This also helps to derive more specific information from individual's points observations. The HB model applies utility to describe the measure of preference placed on an attribute's level by individual choice maker. This corresponds to the use of effect to describe the measure of preference by

MNL model. Subsections 10.4.1to 10.4.6 discuss the parameter estimates from the HB model.

8.4.1 Estimated Willingness to Pay (WTP)/ Loss in Rent

The HB estimation of parameters at an individual level shows distinctive levels of preference of what respondents are willing to pay as rent on residential property with a grave. As shown in Table 8.8, a 10 percent rent increase in rent attracts -24.69 utiles while the minimum discounted rent "5 percent" also show negative utility with a corresponding value of -19.53. The implication of the negative utilities observed on the two attributes' level shows that respondents are generally neither disposed to paying less than 5 percent of the full rent to rent a residential property with grave nor paying 10 percent above the market rent on a similar property without a grave. Apart from the two variable levels discussed above, all the remaining three levels show positive values though a 10 percent discount is barely attractive, as it accounts for a marginal value of 1.23695. However, a 15 percent discount produces 16.90034 while a 20 percent discount produces the highest average utilities among all the variable levels. The HB result is almost similar to the aggregate estimation using logit model except for the 10 percent variable level, which displays a positive value.

Table 8.8: Average Utility Estimate for Rent Discount

Variable Level	Average Utilities
-5% discount	-19.53138
-10% discount	1.23695
-15% discount	16.90034
-20% discount	26.08502
10% rent increase	-24.69094

8.4.2 Tenants' Choice among Residential Properties with Graves

The model estimation of the five parameters assigned to this variable from Table 8.9 shows that respondents prefer a residential property without grave; it represents 163.1379. Among properties with graves, those with them at the backyard are the

most preferred by respondents as it represents 15.4691 of the average utility. A property with a grave at the side with -27.5012 followed this. Similarly, a residential property with a grave at the frontage and in a room produces -41.2200 and -109.8858 respectively. The effect of a grave on preference for a home is apparent from the data. All the homes with graves except those with them the backyard have negative utility. The inference shows that while a dwelling without a grave is most preferred, tenants' are somewhat tolerant to the choice of a home with it at the backyard. The magnitude of the utility obtained on a home without a grave and with it in a room is evident of the preference for the former and hatred for the latter.

Table 8.9 : Average Utility Estimates for the Grave Variable

Variable Levels	Average Utilities
Grave at the frontage of a residence	-41.2200
Grave beside a building	-27.5012
Grave at the backyard of a building	15.4691
Grave within a room	-109.8858
No grave	163.1379

8.4.3 Building Services

Estimation shows that residential property with 24 hours electricity and water supply has the highest average utility with 12.3917. Rationally, the magnitude of the utility commanded by this variable level is not surprising as constant supply of this service is the norm in an ideal home. Similar to what appears to be ideal, 24 hours of electricity supply and 8 hours of water supply recorded 7.8713 and represents the next most preferred variable level in the utility profile. However, a property with 8 hours of electricity and 24 hours of water supply per day produces a utility of -6.8585. This implies that respondents place more priority on constant power supply than water supply. High negative utility value obtained on a residential property with 8 hours of electricity and power supply per day confirms the implication. Respondents linked their preference for constant electricity over water supply to the relative ease of storing water for later use than power supply (see Table 8.10 for details).

Table 8.10: Average Utility for Building Services

Variable Level	Average Utilities
24 hours electricity and water supply	12.3917
8 hours of electricity and water supply per day	-13.4046
24 hours of electricity and 8 hours of water supply per day	7.8713
8 hours electricity and 24 hours of water supply per day	-6.8585

8.4.4 Compound Size and Fence

The estimation of this attribute's levels from Table 8.11 shows that a residential property with a large compound without fence has the least utility, with a value of -16.4360. Conversely, a fenced residence with a small compound produces -6.7067. A residential property with a large compound and a fence represents 18.8764 while another with a small compound without a fence produces 4.2663. A critical look at the average utilities obtained from the four variable levels signifies that compound size is more important than a fence. Further findings on the utility obtained on compound size and fence reveal the possible influence of other variable levels from other attributes such as constant power supply. Respondents believed that a residential property with a large compound and a fence is ideal. However, in a tropical city with irregular power supply, respondents prioritise residential characteristics that enhance the natural balance of ventilation in the internal environment over a fenced home with a small compound. This justification explains the possible rationale for the positive utility estimate obtained on a small compound without a fence and a negative utility value on a small compound with a fence.

Table 8.11: Average Utility for Compound Size and Fencing

Variable Level	Average Utilities
Large Compound no fence	-16.4360
Large compound with fence	18.8764
Small compound with fence	-6.7067
Small compound no fence.	4.2663

8.4.5 Accessibility to Work and Local Services

The analysis of data gathered from this attribute is as presented in Table 8.12. The analysis shows that a residential property located in a location with the greatest accessibility advantage of not more than 15 minutes commuting time to work and local services has the highest utility '3.6645'. Conversely, properties in remote locations of about 30 minutes to work and local services have -4.4004 and the least utility value among the estimated variable levels. Similarly, a residential property located not more than 15 minutes to a respondent's place of work and 30 minutes to local services has a negative utility value of -0.0620. However, the estimation shows a positive utility of 0.7978 on a property located within 15 and 30 minutes commuting distance to local services and work respectively. This explains the fact that respondents are more inclined to renting a property located close to local services than their place of work.

Table 8.12 : Average Utility for Accessibility

Variable Levels	Average Utilities
15 minutes by bus to work and local services	3.6645
30 minutes bus to work and local services	-4.4004
15 minutes to work and 30 minutes to local service	-0.0612
15 minutes to local services and 30 minutes to work by bus	0.7978

8.4.6 Room Size and Ventilation

An analysis of the data collected on room size and ventilation is shown in Table 8.13 below. The estimation shows that a double bed size room with cross ventilation has a utility of 36.2174. This represents the highest utility among all the variable levels. An average of 7.3197 on a single bedroom size with cross ventilation follows this. Only these two variable levels with cross ventilation offer average utilities with positive values irrespective of the bedroom's size. Conversely, property with either double or single bed size room without cross ventilation represents -5.1457 and -38.3909 respectively. The implications of the parameters are apparent from the estimates, a conclusion can be drawn that tenants placed more importance on cross ventilations than room size.

Table 8.13: Average Utility for Room Size and Ventilation

Variable Level	Average Utility
Double bed size room(s)(100 sq ft),with cross ventilation	36.2174
Double bed size room(s)(100 sq ft,) without cross ventilation	-5.1457
Single bedroom(s)(70 sq ft), with cross ventilation	7.3192
Single bed size room(s)(70 sq ft),without cross ventilation	-38.3909

8.5 Average Importance of Attributes from HB Estimation

The result in Table 10.14 shows that a grave is the most important attribute affecting the probability of a respondents' decision to rent a residential properties. It represents an average importance of 48.21 percent among the variables affecting their choice of residential property. Rent contributes an average importance of 15.29 percent to respondents' residential choice decision. Rooms' size and ventilation has an average importance of 13.51 percent while compound size and fencing has an average contribution of 9.55 percent to respondents' decision to rent a residential property. Building services has an average importance of 7.94 percent while accessibility has average importance of 5.50 percent.

Table 8.14: Attributes' Importance to a Residential Choice Decision

Position	Attributes	Average Importance (%)
1	Grave Rent	48.21
2	Rent	15.29
3	Rooms Size and ventilation	13.51
4	Compound size and fencing	9.55
5	Building services	7.95
6	Accessibility	5.50
	Total	100.00%

8.6 Validation of HB Model Estimates Using Fixed Choice Task

One of the advantages of the stated preference approach is the opportunity it offers for internal validation of a model's results. The inclusion of fixed choice questions in the choice task facilitates this. Model estimation of the stated choice data normally excludes the data collected from these questions; however, they are analysed separately to produce estimates for internal validation of model's predictions. The focus here is on the validation of the specific parameter estimates that have a direct touch on the research objectives. Therefore, the Holdout estimates attempt to validate parameter estimates for three of the research objectives. First is the WTP estimate for a residential property with a grave in subsection 8.6.1. Second, validation of the reliability of tenants' residential choice estimates follows this in subsection 8.6.2. The third is the validation of average importance of residential attributes to tenants' choices in subsection 8.6.3.

8.6.1 Validation of WTP Estimates Using Fixed Choice Data

To confirm the consistency of respondents stated choices, two fixed choice tasks are included in the stated choice question as discussed in subsection 6.4.3 (iii). The fixed choice design reflects the impact of a grave on the variable of interest "rent" while other variables show no deficiencies to validate the model estimates.

The summary of the distribution of the WTP estimates from the main and fixed choice data is shown in Table 8.15. The distribution of WTP estimates from both set of data lies between 15 and 20 percent rent discount. This implies that a residential property with a grave loses between 15 and 20 percent in its full market rent. However, utility estimates show that the possibility of a loss of 20 percent in rent is more likely in the current local market circumstance. Validating the model predictions, the distribution of WTP estimates from fixed choice data shows that it lies between 5 and 15 percent discount. This implies that a residential property with a grave loses between 5 and 15 percent in the open market rent. However, estimates shows that the chances of 5 percent reduction in market rent is more likely if there is no deficiency in other residential attributes included in the design. In sum, though the model estimates from the main choice data predicts a loss of up to 20 percent in market rent on a residential property with a grave, the model estimates from fixed choice data suggests a maximum loss of 15 percent in rent. Reflecting on the distribution of WTP estimates from both estimations, a marginal difference is observed. While this is unsurprising, the observed difference may be due to market differential explored for collection of both main choice and fixed choice data. The former's design reflects current market circumstance while the latter reflects a more efficient market.

Table 8.15: WTP Estimates for Residential Properties with Graves

Rent (WTP)	Main Choice Estimates	Fixed Choice Estimates
5% discount	-19.5314	16.9490
10% discount	1.2370	-8.5918
15% discount	16.9003	-7.8283
20% discount	26.0850	-57.67901
10% above market rent	-24.6909	57.1501

8.6.2 Validation of HB Estimates of Tenants' Residential Choice Estimates

With respect to consistency of respondents' opinions on residential choice, utility estimates from both estimations as shown in Table 8.16 reveals that a residential property without a grave is most preferred. Tenants' WTP 10 percent above the

market rent to have it in an efficient residential market validates the choice opinion (see table 8.15). For a residential property with a grave, both models produce a consistent opinion, showing that a residential property with a grave at the backyard is most preferred. Similarly, the model estimates shows consistent opinion for the residential property with a grave at the frontage, which ranked fourth on the preference profile in the Table. However, the model estimates for the choice of residential property with a grave in a room and at the side are not consistent. This suggests the possible influence of the market conditions, other attributes in the design and the limitation of bounded rationality principle guiding households' residential choice decision.

Table 8.16: Comparing Main Choice and Fixed Data Estimates

Residential Property	Main Choice Estimates	Fixed Choice Estimates	Preference profile
No grave	163.1379	39.4232	1st
Grave the backyard	15.4691	3.3501	2nd
Grave at the frontage	-41.2200	-20.2777	4th
Grave at the side	-21.5012	-22.2762	inconsistent (5th&3rd)
Grave in the room	-109.8858	-0.2194	inconsistent (3rd&5th)

8.6.3 Validation of Attributes' Average Importance

The estimation of attributes average importance in this study intends to measure the cruciality of each attribute to a residential choice. The relative importance of the attributes from the model's estimation is shown in Table 8.17. Among the six residential attributes in the choice task, the grave attribute contributes the highest average importance, with 21.99 percent contribution to a residential choice decision. While a grave may be undesirable within home by most tenants, the no grave variable level in this attributes is instrumental to its importance status. A 21.95 percent average importance obtained on the rent attribute follows the most important residential attributes. Building services contributes 17.77 percent to the tenants' residential choice decision and next to rent on the attributes importance profile.

While room size and ventilation contributes 13.84 percent, accessibility closely follows it with an average contribution of 12.68 percent to a residential choice. Lastly, compound size and fencing is the least important attribute to a residential choice decision. Section 11.4 of chapter 11 discusses the implications of the estimates from the holdout task data on the reliability of the ones from the main choice estimation.

Table 8.17 : Validation of Average Importance of Attributes

Position	Attributes	Average Importance (%)
1	Grave	21.99
2	Rent	21.95
3	Building service	17.77
4	Rooms Size and ventilation	13.84
5	Accessibility	12.68
6	Compound size and fencing	11.76

8.7 Tenants' Sensitivities to Residential Property with a Grave

Subsections 8.4 1 and 8.4.2, discuss respondents WTP and residential choices in the market. This section draws from the analysis to analyse tenants' sensitivity to rent discount on residential properties with graves in different parts. This is achieved by determining the elasticity of an individual raw utility estimate from the HB estimation to a change in rent discount. Based on the number of point observations from 300 respondents, a level to level multiple regression analysis is applied to determine the tenants' sensitivity to rent discounts on a residential property with a grave at different parts. Sections 8.8 to 8.11 present the analysis of tenants' sensitivity to rent discount in a residential property with a grave at different parts.

8.8 Elasticity of Utility to Rent Discount for a Residential Property with a Grave at the Frontage

Tenants sensitivity to rent discount in a home with a grave at the frontage is analysed by the application of level-to-level multiple regression analysis. The beta coefficients from the analysis correspond to tenants' sensitivity at different rent discounts. This is mathematically illustrated in equation 8.1

$y = \beta_0 + \beta_1(\chi_{1+}. \chi_1 ..... + \chi_n) + \varepsilon_i$ .....equation 8.1

Where:

y= dependent variable

β_0= intercept

β_1=coefficient of independent variables

χ= independent variables

ε_i = random error

Using the variables levels from the experimental choice design, equation 8.2 is derived.

$y = \beta_0 + \beta_1(\chi_1) + \beta_2(\chi_2) + \beta_3(\chi_3) + \beta_4(\chi_4) + \varepsilon_i$ .....equation 8.2

where:

y= utility

$\beta_{0=}$ intercept

β_1= coefficient of discount 1

χ_1= discount 1 (5%)

β_2=coefficient of discount 2

χ_2=discount 3 (10%)

β_3=coefficient of discount 3

χ_3= discount 3 (10%)

β_4=coefficient of discount 4

χ_4=discount 4

Therefore,

$y = \beta_0 + \beta_1(5\%) + \beta_2(10\%) + \beta_3(15\%) + \beta_4(20\%) + \varepsilon_i$ .....equation 8.3

The estimate of β for the four variable levels as generated by level-to-level regression analysis is shown in Table 8.18.

Table 8.18: Estimation of β and χ Coefficients

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-4.60	0.152343144	-30.21565896	2.64E-92
-5% discount	1.10	0.106201072	10.35970614	1.18453E-21
-10% discount	2.11	0.107006443	19.751061	6.49344E-56
-15% discount	0.29	0.127817575	2.302045794	0.022028959
-20% discount	1.09	0.123758787	8.790418663	1.25777E-16

As shown in equation 8.3, (β_0) is the y intercept, which describes the elasticity of utility to zero discount on a residential property with a grave at the front. The elasticity value obtained is greater than 1 in absolute terms; this implies that the demand for a residential property with a grave at the front is elastic.

By taking the first derivative of equation 8.3, the partial elasticity of y (utility) with respect to χ_1 (5 percent change in rent discount) is determined as shown below.

$$\left(\frac{\partial y}{\partial x 1}\right) \quad y = \beta_0 + \beta_1(5\%) + \beta_2(10\%) + \beta_3(15\%) + \beta_4(20\%) \text{.....equation 8.4}$$

$$\left(\frac{\partial y}{\partial x 1}\right) = \beta_1$$

$$\text{Therefore } \frac{\partial utility}{\partial rent\ discount} = \beta_1 = 1.100$$

The implication of this β_1 coefficient is that if a residential property with grave at the front is to be let with a 5 percent rent discount, the utility would increase by 1.100 implying that the utility is elastic at a 5 percent rent discount on a property with a

grave at the front. By repeating the above process for each variable, the elasticity values for the four independent variable levels of rent discount is determined in equation 8.5 shown below and summarised in Table 8.18.

$y = -4.60 + 1.10(5\%) + 2.11(10\%) + 0.29(15\%) + 1.09(20\%) + \varepsilon_i$ .....equation 8.5.

For a 10 percent discount in rent, the responsiveness of the utility to this change is 2.11, meaning that the utility is elastic at a 10 percent discount on a residential property with a grave at the frontage. Conversely, a unit change at 15 percent discount in rent produces an elasticity value of 0.29. This shows that utility is inelastic at 15 percent discount for a property with a grave at the frontage. However, with a 20 percent discount in rent, the responsiveness of the utility tends to be elastic once again as a 1.09 elasticity value is realised. As shown in Figure 8.1, movement along the elasticity curve show that tenants' sensitivity has no relationship with the magnitude of the rent discount. This suggests the influence of other variables on respondents' residential choice decisions.

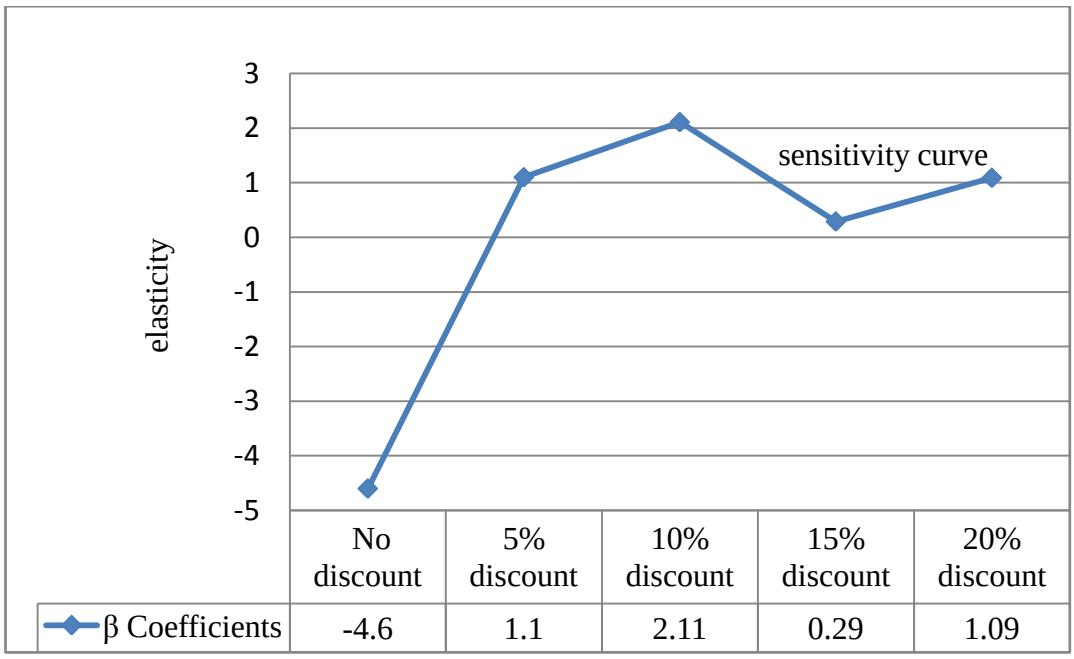


Figure 8.1: Sensitivity to Rent Discount in a Home with a Frontal Grave

8.8.1 Reliability of Regression Results for the Elasticity of Utility of Changes in Discounts

The interpretations of the regression analysis outcomes satisfy three assumptions that are necessary for the reliability of model predictions. Firstly, the Gauss Markov

assumptions, which show that the model is true (as shown in equation 8.5) holds. Secondly, the reliability of the estimated coefficients is statistically significant. Thirdly, all other independent variables in the model are constant.

Having satisfied the basic assumptions for statistical significance of the model, an explanation for reliability of estimates follows. As shown in the regression summary output in Table 8.19 the overall accuracy of the regression model described by the adjusted R square value shows that 79.6 percent of the utility outcome (y) is explained by the impact of the variable inputs (rent discount). In addition, this implies that the outcome obtained is 79.6 percent more than a mere chance occurrence.

Table 8.19: Summary of Level to Level Regression Output Accuracy

Regression Statistics	
Multiple R	0.894019386
R Square	0.799270662
Adjusted R Square	0.796548908
Standard Error	2.215906028
Observations	300

The analysis of variance (ANOVA) in Table 8.20 validates the statistical significance of the model's estimates. The f statistics shows that the outcome of the regression is $1.623x10^{-101}$ percent a mere chance occurrence while means of square (MS) are significantly high.

Table 8.20: Analysis of Variance for Regression Output

	Df	SS	MS	F	Significance F
Regression	4	5767.767084	1441.941771	293.6601693	1.623E-101
Residual	295	1448.52066	4.910239527		
Total	299	7216.287744			

Table 8.18 shows that the standard error is low and the t statistics for the model is very high. Similarly, the low P-values validate the reliability of the regression line coefficients and y intercept. Firstly, the P-value shows that $2.64\ x10^{-92}$ percent obtained expresses the possibility of the y intercept value occurring by chance occurrence. Secondly, the reliability of the regression coefficient for the 5 and 10 percent rent discounts shows that the probability that these values occurred by chance occurrence are $1.18\ x\ 10^{-21}$ and $6.49x10^{-56}$ respectively. Thirdly, the probability that the coefficients obtained for the 15 percent and 20 percent rent discounts occurred by chance occurrences are 2.20 and $1.26x10^{-16}$ percent respectively. It can be inferred that the highest P-value (2.20 percent) obtained on one of the coefficients' estimates is not significant to disapprove the reliability of the model outcome.

Further, the observed and the predicted utilities are compared to validate the reliability of the model estimates of a residential property with a grave at the frontage. In appendix vii, the observed and the predicted utility from equation (8.5) have very close values with marginal differences as shown in the residual, thus validating the reliability of the sensitivity of the coefficient estimates.

8.8.2 Fitness of the Level to Level Regression Models

The fitness of the multiple regressions is tested using residual plots. It assesses how well the regression line describes the elasticity of utility to increase in the rent discount on a residential property with a grave. The scatter plots of the residuals in Figures 8.2 to 8.6 show that the scatter plots show no definite pattern. This validates the fitness of the model to the data and elasticity of utility by showing that the sample is reasonably distributed. Further, the normal probability curve substantiates the model fit. As shown in Figure 8.5 the error terms are normally distributed and there are no outliers. Further validation of the fitness of the model is assessed by deriving predicted utilities from equation 8.5 and plotting the line of fit at different rent discounts for a residential property with a grave at the frontage.

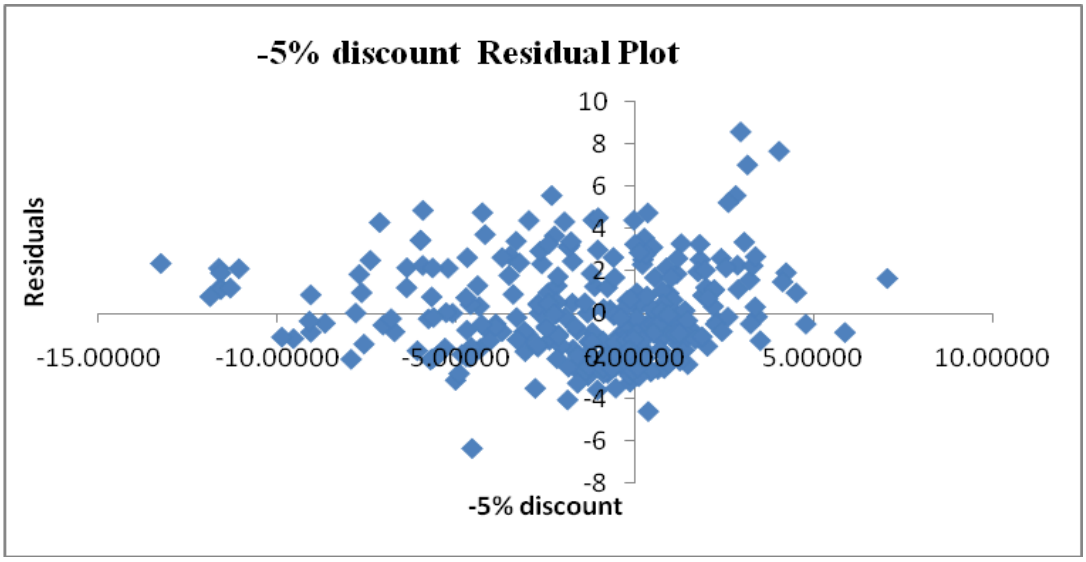


Figure 8.2: Residual Plot for 5 Percent Rent Discount

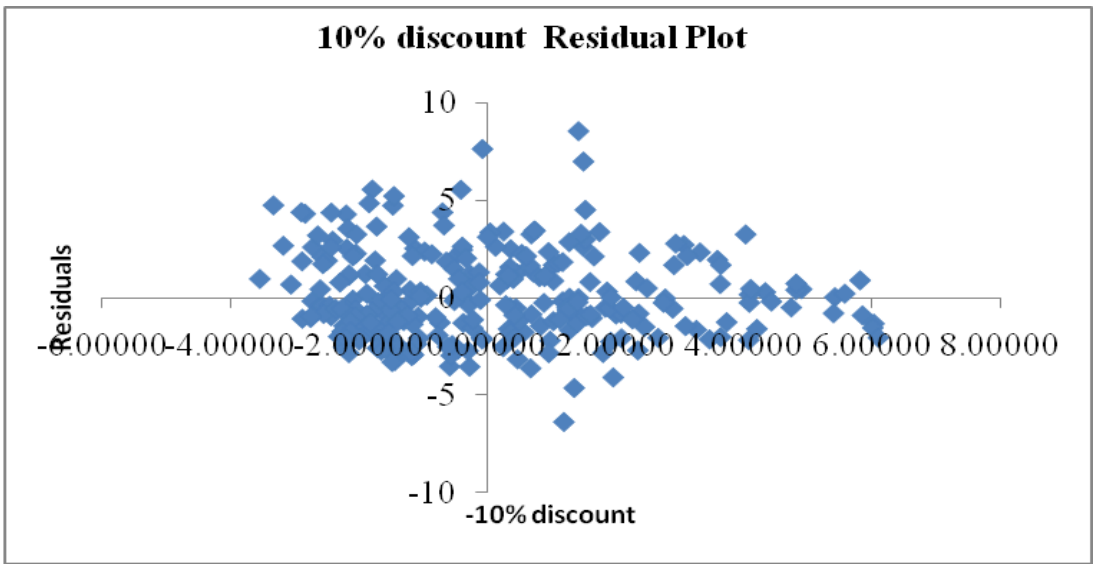


Figure 8.3: 10 percent Discount Residual Plot

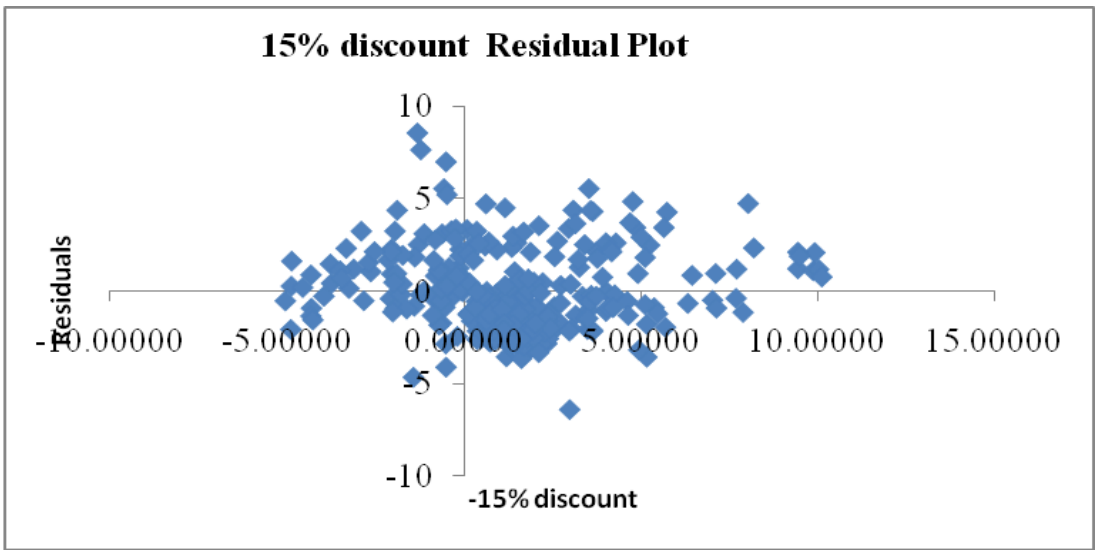


Figure 8.4: 15 percent Discount Residual Plot

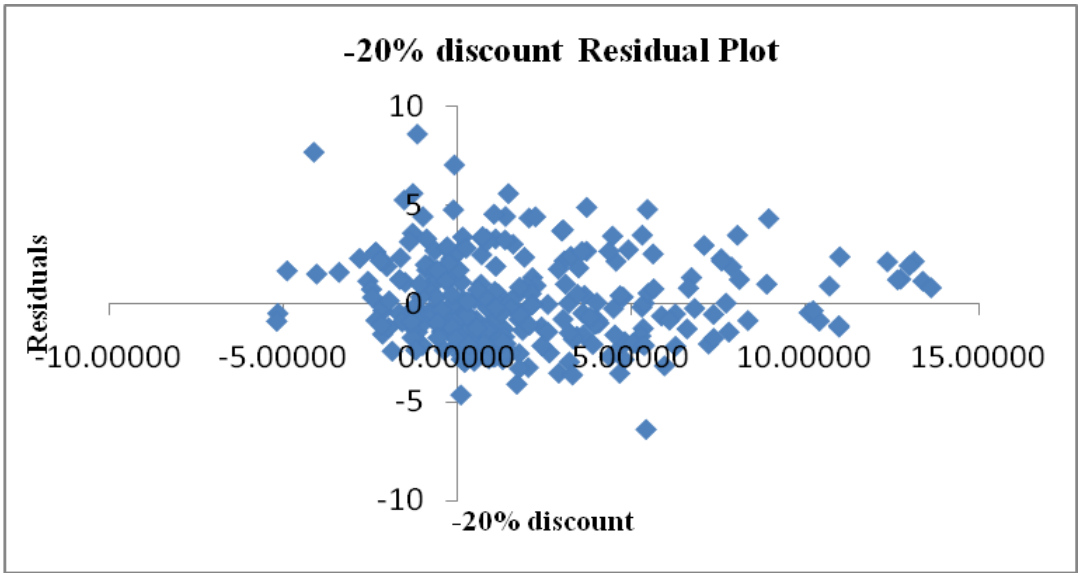


Figure 8.5: 20 percent Discount Residual Plot

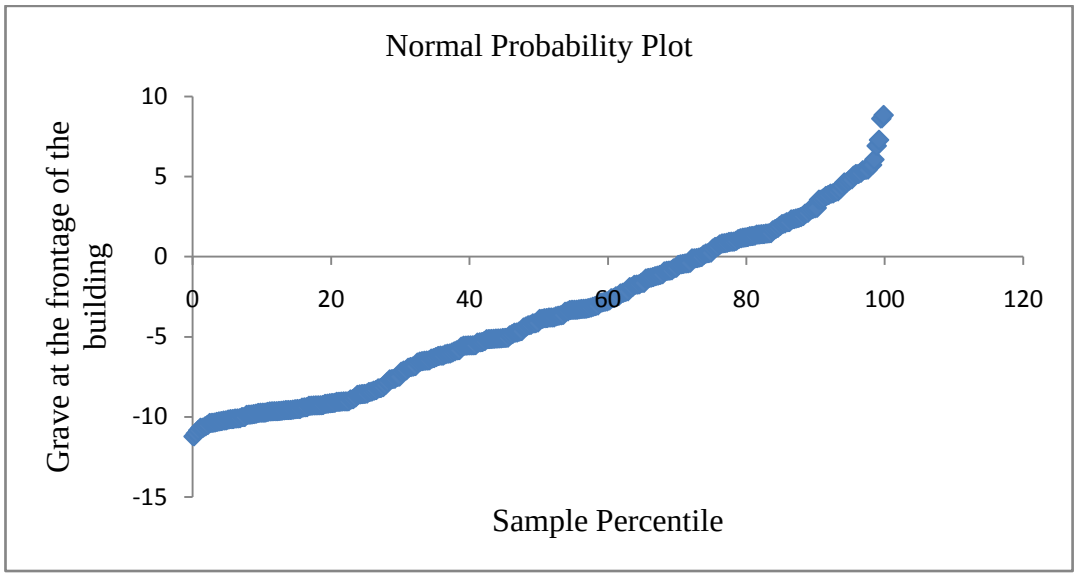


Figure 8.6: Normal Probability Plot for the Fitness of the Data

8.8.3 Predicted Elasticity in Residential Property with a Grave at the Frontage

This subsection attempts to validate the elasticity value by deriving the elasticity value from a predictive point of view and comparing it with the elasticity value obtained from the respondents' observations. The line of a fit plot helps to determine the Beta value from a scatter line plot using predicted utility data. As shown in Figure 8.7 the elasticity of utility with respect to a 5 percent rent discount on a property with a grave at the frontage is -0.335. This implies that the responsiveness of utility at a 5 percent rent discount is inelastic.

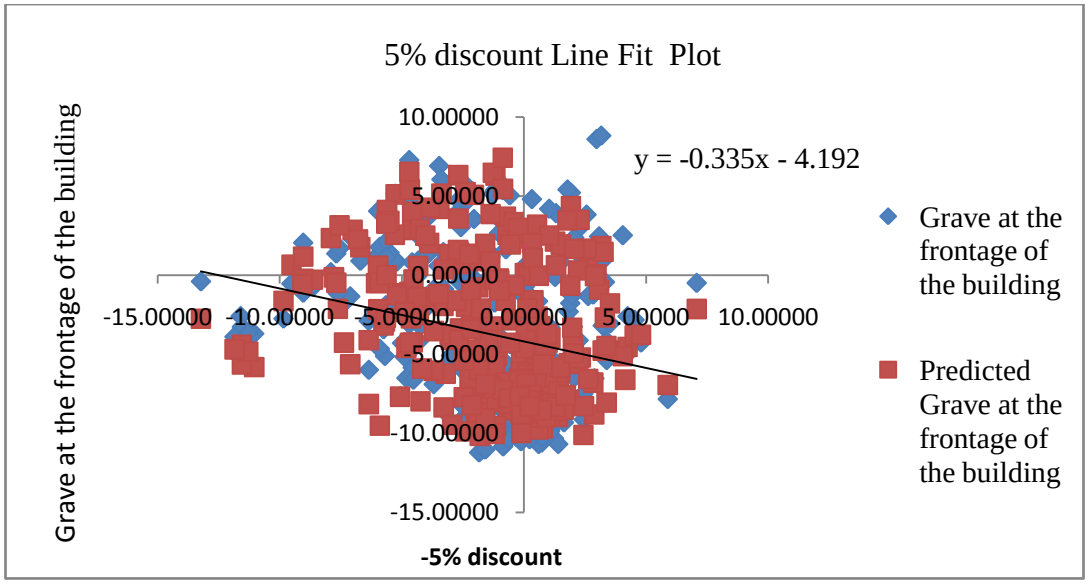


Figure 8.7: 5 Percent Discount Line Fit Plot

An investigation of tenants' sensitivity to other rent discounts follows a similar process highlighted above. The elasticity of utility at a 10 percent rent discount is 1.90. This means that demand is elastic at 10 percent discount with a grave at the frontage as shown in Figure 8.8.

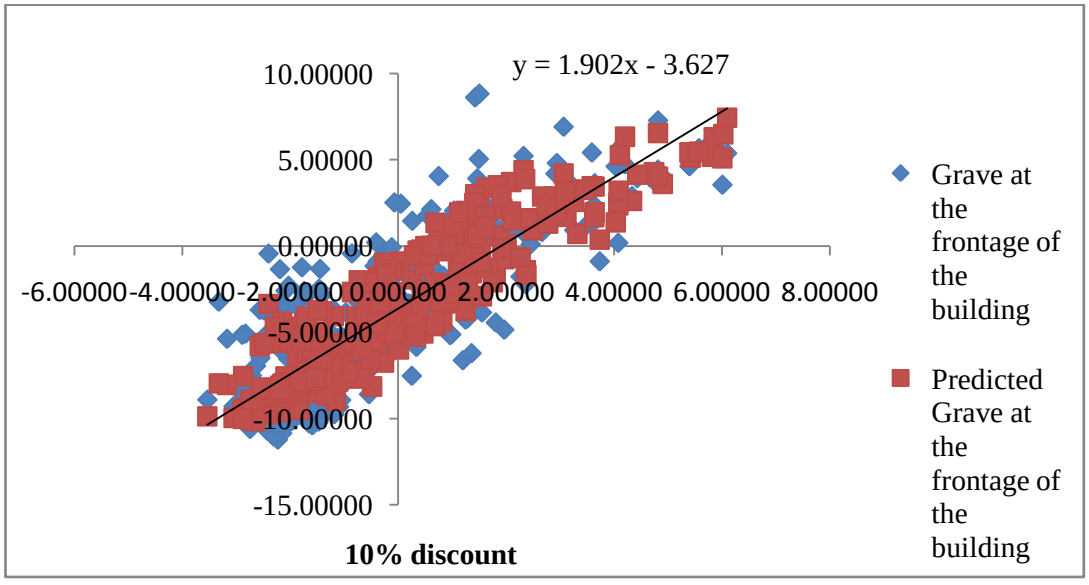


Figure 8.8: 10 Percent Discount Line Fit Plot

For a 15 percent discount in rent, a negative trend line that leads to a negative elasticity value of -0.281 is observed as shown in Figure 10.9. The elasticity value is less than one in absolute terms. It implies that the elasticity of demand at 15 percent discount in rent on a residence with a grave at the front is relatively inelastic.

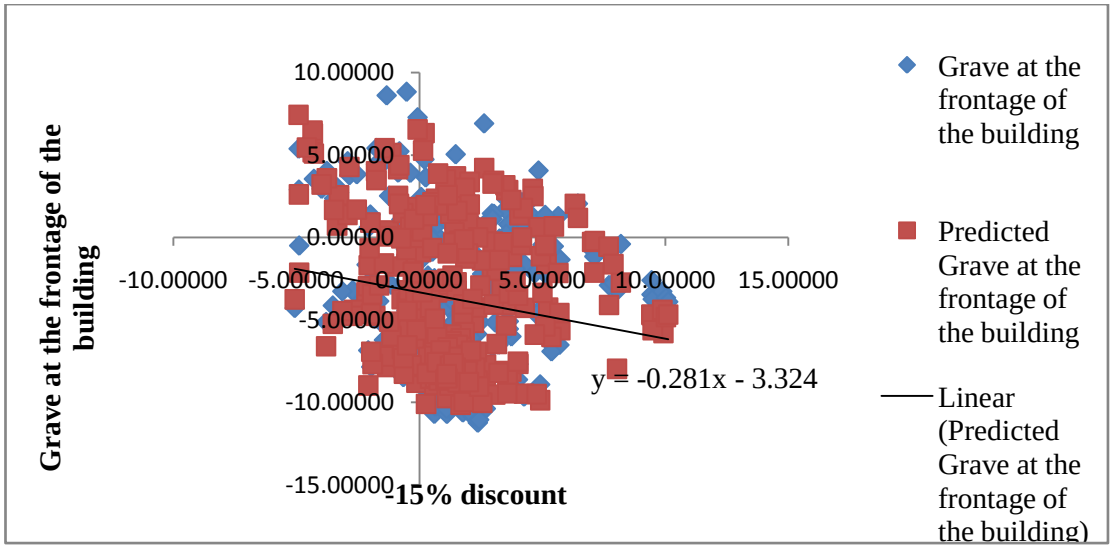


Figure 8.9: 15 Percent Discount Line Fit Plot

As shown in Figure 8.10 the responsiveness of utility to a change in rent to a 20 percent discount is 0.445. Although the sensitivity of demand to this highest possible discount on rent in this choice process is positive it is relatively inelastic. This implies that respondents are not highly sensitive to a high rent discount in a residential property with grave at the frontage.

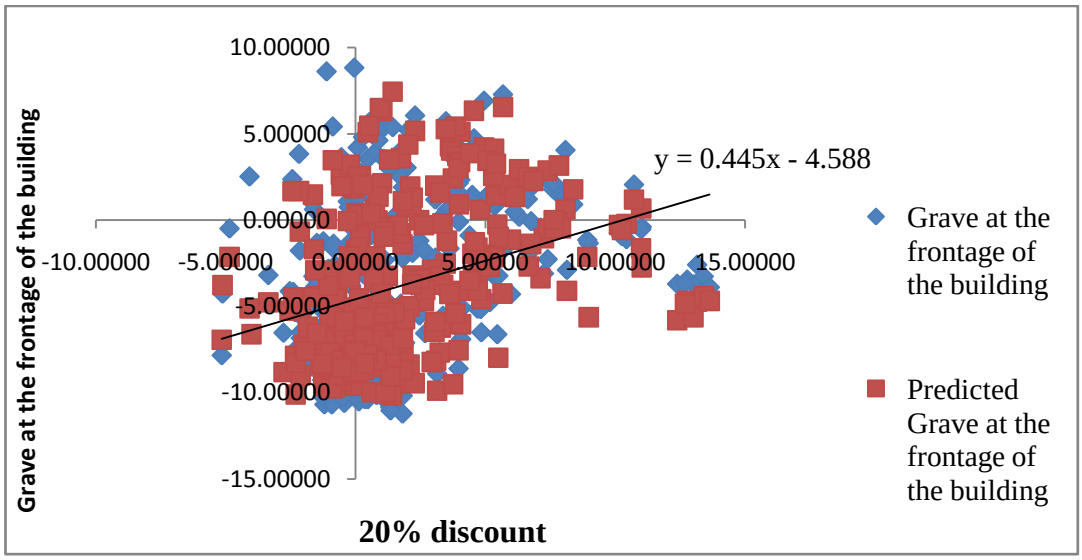


Figure 8.10: 20 Percent Discount Line Fit Plot

The elasticity of utility generated from the line of fits plot was validated by using an equation produced in each plot to derive predicted utility from residential properties with graves at the frontage. As shown in Appendix (v), the utilities predicted by equation 10.5 on each rent discount are very close to the observed utility values from the respondents' observations. Hence, the low residuals obtained corroborate the

validity of the elasticity values. The summary of the observed and predicted elasticity in table 8.21 shows that only marginal differences exist between all the variables.

Table 8.21: Summary of Predicted and Observed Elasticity for a Property with a Grave at the Frontage

Rent Discount	Predicted Elasticity	Observed Elasticity
5 Percent	-0.335	1.100
10 percent	1.902	2.113
15 percent	-0.281	0.294
20 percent	0.455	1.088

8.9 Elasticity of Demand to Rent Discount for a Property with Grave at the side

From the regression coefficient estimate shown in table 8.22, the y intercept is -3.372; this implies that a property with a grave at the side without a discount is elastic although the direction of responsiveness is negative. With a 5 percent discount, utility tends to be elastic with a positive value of 1.153. Similarly, a 10 percent change in a rent discount also commands an elasticity value of 1.150. Conversely, utility on same type of properties is inelastic to further increase in rent discount. For instance, 15 and 20 percent discount produce an elasticity of 0.865 and 0.725 respectively (See Table 8.22 for details). Arguing from a similar empirical stance, Figure 8.11 shows that movement along the elasticity curve does not depend on the magnitude of the rent discount. This observation is similar to the tenants' sensitivity to varying rent discount in a residential property with a grave at the frontage. Subsection 8.9.1 validates the reliability of the elasticity values, with respect to tenants sensitivity to rent discount in a residential property with a grave at the sides.

Table 8.22: Estimated Beta Coefficients for a Property with a Grave at the Side

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-3.372112588	0.2176958	-15.49	5.16E-40
5% discount	1.153307036	0.15175955	7.599568	3.97E-13
10% discount	1.150006737	0.15291042	7.520787	6.6E-13
15% discount	0.864591506	0.18264917	4.733618	3.43E-06
20% discount	0.725272374	0.17684923	4.101077	5.32E-05

By adopting equation 8.4, the elasticity of utility demanded for a property with a grave at the side is shown in equation 8.6s;

$$y= -3.372 + 1.153(5\%) + 1.150(10\%)\ 0.865(15\%) +0.725(20\%) + \varepsilon_{i.....} \quad \text{equation 8.6}$$

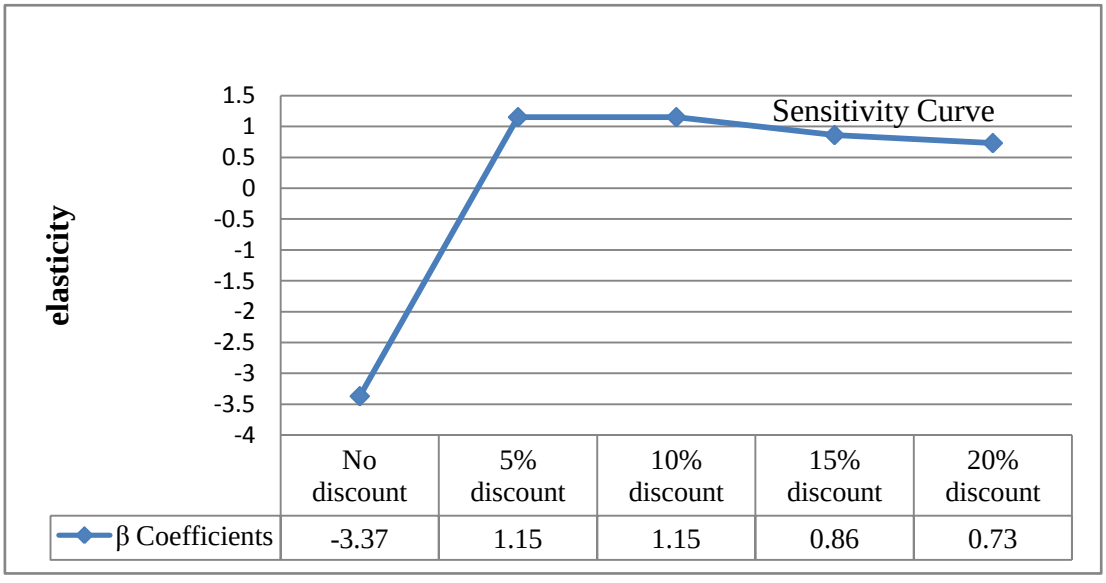


Figure 8.11: Sensitive of Tenants to Discount in a Home with a Grave at the Side

8.9.1 Reliability of the Regression Coefficient Estimate

The overall accuracy of the regression estimates shows that about 31 percent of the output is described by the impact of the rent discount. As shown in Table 8.23 the standard errors assigned on the coefficients are comparatively low across the variable

levels. Similarly, table 8.25 reveals that the probability of a chance occurrence of the outcome obtained from the estimation is far less than 1 percent on all the Beta values. The significance of f statistics in Table 8.24 corroborates this, showing that the outcome of the regression is $2.473x10^{-23}$ percent due to chance occurrence. The Table also reveals that the sum of squares (SS) "1363" and means of squares (MS) "340" are also large enough to confirm the reliability of the results.

Table 8.23: Summary of the Regression Statistics

Regression Statistics	
Multiple R	0.561706043
R Square	0.315513678
Adjusted R Square	0.306232508
Standard Error	3.166492615
Observations	300

8.24: Analysis of Variance

	Df	SS	MS	F	Significance F
Regression	4	1363.42858	340.8571	33.99503	2.4737E-23
Residual	295	2957.86927	10.02668		
Total	299	4321.29785			

8.10 Elasticity of Utility to Changes in a Rent Discount for a Property with a Grave in the Backyard

For a property with a grave at the backyard, Table 8.25 shows that the β_0 (y intercept) has an elasticity of 0.16, the lowest one among the discount levels. This implies that at zero rent discount, the responsiveness of respondents in this type of property is inelastic and comparatively low compared to a similar property with varying rent discounts. A 5 percent rent discount on a residential property with grave at the backyard produces a beta value (β_1) of 0.27. A change in rent discount to 10 percent leads to a value of 0.86, which, tends toward unitary elasticity for β_2.

However, a reduction in the beta value "0.49" is obtained for β_3 when the rent discount is increased to 15 percent. Similarly, a further increase in rent discount to 20 percent leads to a reduction in the beta coefficient; an elasticity of 0.34 is obtained for β_4 The common characteristic of the beta coefficients suggests that the utility for a residential property with a grave at the backyard is inelastic to change (increase) in rent discount. Figure 12.11 gives a pictorial representation of tenants' sensitivity behaviour to rent discount in a home with a grave at the backyard.

Table 8.25: Beta Coefficients for a Home with a Grave in the Backyard

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.158224	0.101867429	1.55323	0.12144
-5% discount	0.2790929	0.071013568	3.93014	0.00011
-10% discount	0.8601421	0.071552096	12.0212	2.3E-27
-15% discount	0.4881461	0.085467894	5.71146	2.7E-08
-20% discount	0.3355574	0.082753901	4.05488	6.4E-05

$$y= 0.1582 + 0.2791(5\%) + 0.8601(10\%) + 0.4881(15\%) +0.3356(20\%) +\varepsilon_{i.....}$$

.equation 8.6.

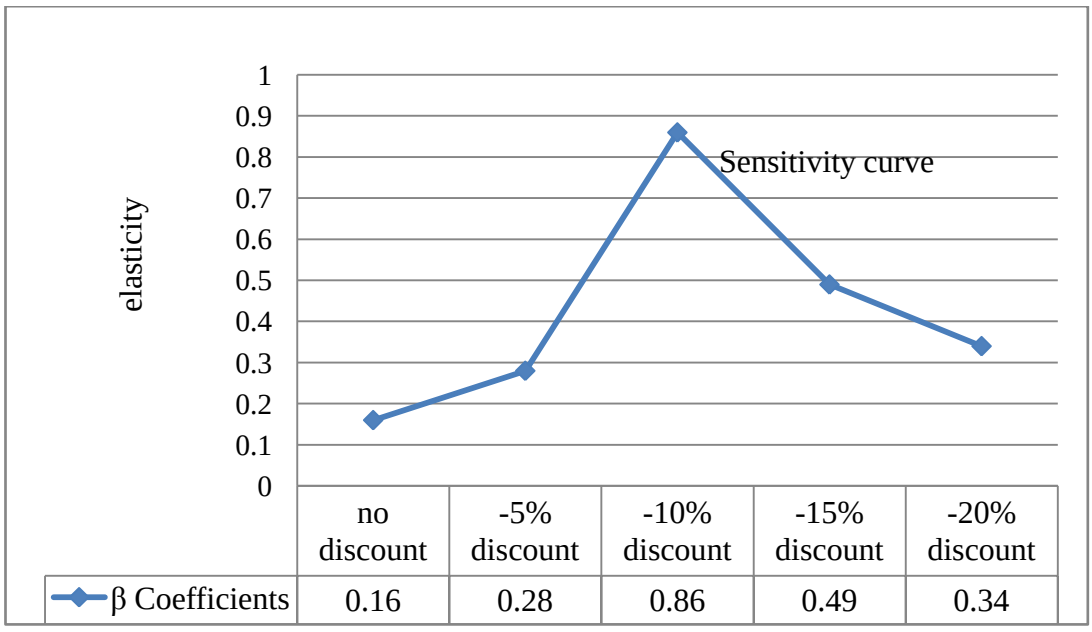


Figure 8.12: Sensitivity to Rent Discount in a Home with Grave at the Backyard

8.10.1 Reliability of the Regression Coefficients

The overall accuracy of the regression coefficient validates reliability of the regression outcomes. The adjusted R shows that 64 percent of the output variable is explained by the impact of the rent discounts as shown in Table 8.26. The p-value for all beta coefficients in Table 8.25 shows that the possibility of the outcomes occurring by mere chance is less than 1 percent. Similarly, the table shows that the standard errors on all beta coefficients remain very low, while the t stat value is high. Further, the significance of F statistics as shown in table 8.27 corroborates this. It shows that the probability that the beta coefficient values obtained occur by mere chance occurrence is 1.8524×10^{-65} percent.

Table 8.26: Regression Accuracy for Property with a Grave at the Backyard

Multiple R	0.8044087
R Square	0.6470734
Adjusted R Square	0.6422879
Standard Error	1.4817119
Observations	300

Table 8.27: Analysis of Variance of Beta Coefficient

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	4	1187.459115	296.865	135.217	1.8524E-65
Residual	295	647.6637003	2.19547		
Total	299	1835.122815			

8.10.2 Predicted Elasticity of Utility in a Home with a Grave at the Backyard

The reliability of the model result is validated by deriving the predicted elasticity and comparing it with the elasticity obtained from the respondents' observations. As shown in Table 8.28 a marginal difference exists between all the elasticities of the variable levels except for the 5 percent level. Similarly, the probability plot in figure 8.13 shows that the errors are normally distributed and there are no outliers.

Table 8.28: Predicted Elasticity of Demand in a Home with a Grave at the Backyard

Rent Discount	Predicted Elasticities	Observed Elasticities
5 Percent	-0.421	0.279
10 Percent	0.600	0.860
15 percent	0.29	0.488
20 percent	0.456	0.366

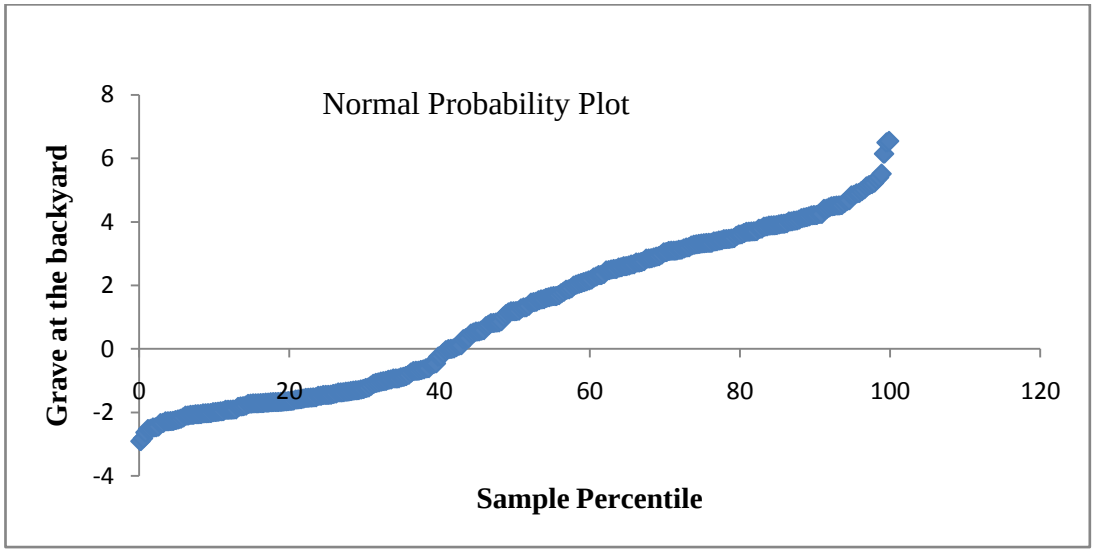


Figure 8.13: Normal probability plot for property with a grave in the backyard

8.11 Elasticity of Utility for an increase in the Rent Discount for a Property with a Grave in a Room

As shown in Table 8.29, a residential property with a grave in a room produces a sensitivity of -9.48 with no rent discount as shown by β_0 (y intercept); this implies that the responsiveness of a tenant to a zero rent discount on a property with a grave in a room is elastic. However, the negative sign on the elasticity value shows that most respondents would not agree to rent a property with a grave in a room at the full market rent of a comparable property without it. In the same way, a rent discount of 5 and 10 percent generates a negative elasticity values. The former value is -0.89 while the latter is -0.76, indicating that utility is inelastic at both discount levels.

Similarly, a -1.42 elasticity value is obtained for a 15 percent rent discount. The elastic value is higher than 1 in absolute terms. However, the responsiveness to this discount level does not produce a corresponding increase in utility expected with a reduction in price of an inferior good. With a 20 percent discount in rent on a residential property with a grave in a room, utility tends to be inelastic with a positive elasticity value of 0.53. Figure 8.14 provides a pictorial representation of tenants' sensitivity to rent discount in a residential property with a grave in a room. Movement along the elasticity curve shows that there is no direct relationship between a reduction in rent and tenants' residential choice.

Table 8.29: Estimated Beta Coefficients for a Residence with a Grave in a Room

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-9.4769849	0.111015157	-85.36659	5.04E-210
-5% discount	-0.8996586	0.077390609	-11.62491	5.708E-26
-10% discount	-0.757794	0.077977497	-9.718112	1.508E-19
-15% discount	-1.4178337	0.093142939	-15.22213	5.125E-39
-20% discount	0.53825772	0.090185228	5.968358	6.864E-09

$y = -9.45 - 0.89\,(5\%) - 0.76\,(10\%) - 1.42(15\%) + 0.54(20\%) + \varepsilon_i$

.....equation 8.7

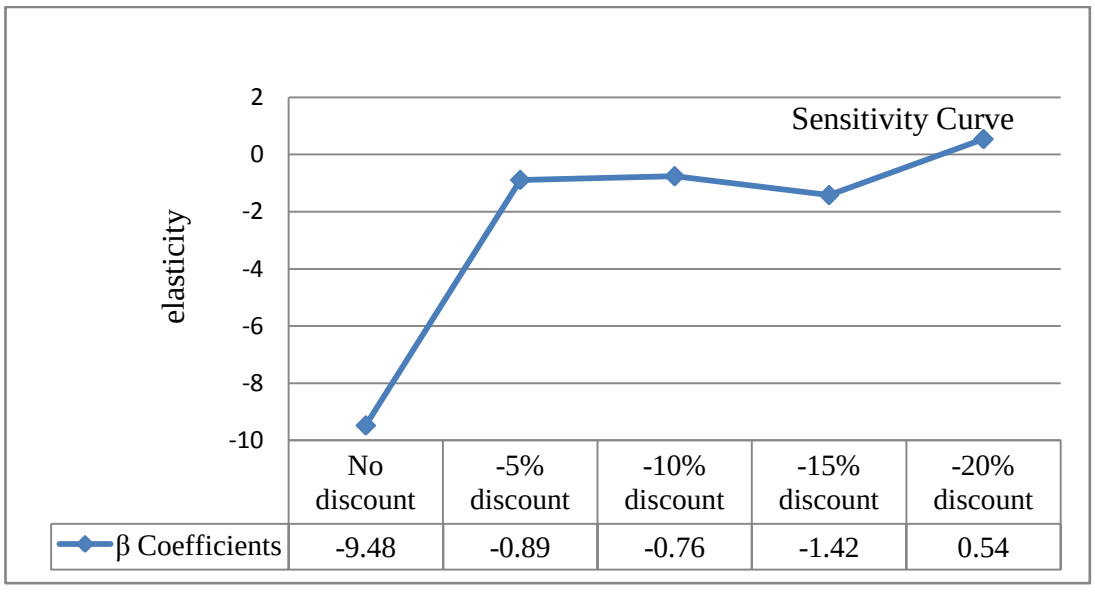


Figure 8.14: Sensitivity to Rent Discount in a Home with a Grave in a Room

8.11.1 Reliability of the Elasticity Value

From a predictive stance, the reliability of the elasticity value depends on the overall validity of the regression model, the F significance of the model and the P-value on the individual beta coefficients. As shown in Table 8.30, 66 percent of the regression output is explained by the impact of the rent variables. An analysis of variance in Table 8 31, shows that the model is statistically significant, with an f significance of less than 1 at 95 percent confidence level. Similarly, the significance of the individual β coefficients as described by the P-value across all the beta values are less than 1 as shown in Table 8.29. This implies that the chances that all the beta values occurred by mere chance are low and are significant at the 95 percent confidence level. Further, the Table shows that the standard errors across board are significantly low while the t Stats are very high.

Table 8.30: Regression Accuracy for a Residential Property with a Grave in a Room

Regression Statistics	
Multiple R	0.81613067
R Square	0.66606928
Adjusted R Square	0.6615414
Standard Error	1.61477011
Observations	300

Table 8.31: Analysis of Variance for Significance of Beta Coefficients

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	4	1534.286425	383.5716	147.10419	5.445E-69
Residual	295	769.2073436	2.607483		
Total	299	2303.493768			

8.11.2 Comparing Predicted and Observed Elasticity Values

Using the model for utility of a residential property with a grave in room in equation 8.7, the predicted utility is derived. As shown in Appendix viii, only a marginal

difference exists between the predicted and observed utilities. Further, from the line fit plots for the rent discount variable levels shown in Appendix vi, the predicted elasticities are derived and shown in Table 8.32. Comparatively, the predicted and observed elasticities for a 5 percent rent discount are inelastic as -0.494 and -0.899 respectively. With a 10 percent rent discount, the elasticity tends to be inelastic, but in a different direction. A positive elasticity value of 0.35 is obtained from the predictive point of view while a negative value -0.758 is obtained from respondents' observations. For a 15 percent rent discount, the elasticity tends to be inelastic with a value of 0.129 from a prediction point of view while the elasticity is elastic with a -1.42 value from respondents' observations. With regard to a 20 percent discount, the elasticity of utility from prediction and observation tend to be inelastic with 0.413 and 0.538 values respectively.

Table 8.32: Predicted Elasticity of Utility for Rent Discounts in a Residential Property with a Grave in a Room

Rent Discount	Predicted Elasticity	Observed Elasticity
5 Percent	-0.494	-0.899
10 Percent	0.35	-0.758
15 Percent	0.129	-1.417
20 Percent	0.413	0.538

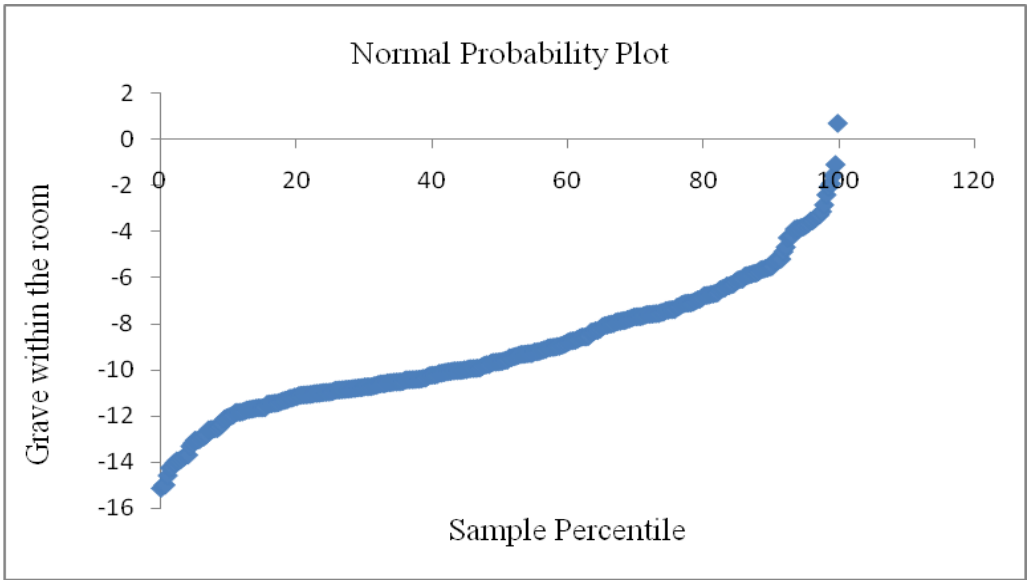


Figure 8.15: Normal Probability Plot for a Property with a Grave in a Room

8.12 Choice Model for Tenants under Externality

This section analyses tenants' residential choice to develop a model that predicts their behaviour in the market. To achieve this, average Betas for all the decision vectors (estimated variable levels) are analysed. In all, the study examined 26 estimated parameters for possible inclusion into the model (see Table 8.33 for details). The choice model explains tenants' residential choice behaviour when choosing from a set of residential properties with graves. The development of the models involves five steps highlighted below.

- Identification of decision vectors (variable levels)
- Verification of the linearity assumption
- Verification of the continuity of all variables (that is, capability of taken a range of values)
- Constructing the objective function (using maximum function in this case)
- Consideration of all constraints, variation in perceptions with particular reference to individuals' cognitive bound.

The study context defines steps 1 to 3 in the choice model. For step 4, two objective functions are possible, namely maximum and minimum functions. Using the maximum objective function, all average mean betas for the variable levels (decision vectors) with the highest coefficients are included in the final model. With recourse to step 5, it is acknowledged that the model is subject to some constraints such as income and cognitive bounds. With this, a model explaining a tenant residential choice when faced with a set of residential properties with graves is as shown below. The choice model shows that tenants prefer a choice of residential property with a 20 percent discount, constant power and water supply, a large compound with a fence, high accessibility to work and local services, a double room with cross ventilation but with a grave at the backyard.

Choice=

20%DISCNT+24ELE&WAT+GRBA+LACOMPWFE+15WK&LS+DROM CRVENT

Table 8.33: Variable Codes

S/N	Parameter	Coding	Mean Betas
1	5% Discount	5%DISCNT	1.40926
2	10% Discount	10%DISCNT	-0.04824
3	15% Discount	15%DISCNT	1.39937
4	20% Discount	20%DISCNT	1.95293
5	10% Rent increase	10 RINCR	-1.89480
6	24 Hours Electricity and Water Supply	24Ele24Wat	0.98324
7	8 Hours of Electricity and water supply	8Ele8Wat	-1.06054
8	24 Hours Electricity and 8 hours of water supply	24Ele8Wat	0.51524
9	8 Hours Electricity and 24 hours of water supply	8Ele24Wat	-0.43794
10	Grave at the frontage of the building	GRF	-0.71926
11	Grave beside the building	GRBE	-2.42661
12	Grave at the backyard	GRBA	1.06183
13	Grave within the room	GRORO	-9.10547
14	No grave	NOGR	14.18951
15	Large Compound without fence	LACOMPNFE	-1.39087
16	Large Compound with a fence	LACOMPWFE	1.62438
17	Small compound without fence	SCOMPWFE	-0.52032
18	Small compound no fence	SCOMPNFE	0.28681
19	15 minutes to work and local services	15MW&KLS	0.30023
20	30 minutes by bus to work and local services	30MWK&LS	-0.29409

21	15 minutes to work and 30 minutes local services	15MWK30MLS	-0.04880
22	15 minutes local services and 30 minutes to Work	15MLS30MWK	0.04266
23	Double room with cross ventilation	DROMCRVENT	2.94412
24	Double room, no cross ventilation	DROMNOCRVENT	-0.37358
25	Single room with cross ventilation	SROMCRVENT	0.56368
26	Single room, no cross ventilation	SROMNOCRVENT	-3.13422

8.13 Conclusion

This chapter presents an analysis of data from the choice based conjoint experiment using two models. Estimated results discussed in the chapter are based on estimates from MNL and HB run, which include all variable levels with one interaction. While the former estimates the stated choice data at aggregate level, the latter did it at individual level. Both models present analysis of data on WTP for residential property with a grave. However, the HB model estimates the contribution of each variable to a residential choice decision. The chapter also analyse tenants' sensitivity to rent discounts in residential properties with graves at different parts. The next chapter discusses the implications of the model estimates on the research objectives.

Chapter 9
Discussion of Parameter Estimates

9.1 Introduction

This chapter provides a synthesis of the empirical findings from the analysis of both parametric and non-parametric data that address the research objectives. The chapter includes eight sections. It begins with a recap of the aim and objectives of the study, research hypotheses and the conceptual framework in section 9.2. Sections 9.3 to 9.7 present a blended discussion on the findings from parameter estimates, which converge to explain the specific research objectives and answer the research questions. The sections reflect on the specific findings, which provide a debate that addresses the core research's problems. Section 9.8 presents a conclusion to the chapter.

9.2 Research Aim, Objectives, Hypotheses and Conceptual Framework

The aim of the study revolves around the following objectives explained by the research findings.

i. Examine tenants' choices among a discrete set of residential alternatives with a grave and without it.
ii. Examine the importance of a grave to tenants' decision to rent a residential property.
iii. Examine tenants' WTP for a residential property with a grave.
iv. Examine the sensitivity of respondents to rent discount in a residential property with a grave.
v. Examine the legal implications of the location of a grave on a residential property.

In consonance with the global property market practice, environmental health and development control laws guide the Nigeria residential market. The measure acts as a safety net, which guarantees the delivery of an interest in property that meets the socio-economic welfare of all market actors without sacrificing market value. With recourse to the widespread phenomenon of residential properties with graves in the

study area, the study raises some questions that are crucial to the achievement of its aim and objectives. First, the efficiency of the environmental health law and market regulatory mechanism is queried. Second, what is the impact of the externality of a grave on tenants' residential property choices? Third, what is the impact of a grave on the market rent of a residential property? Fourth, how adequate is the perceived current neoclassical economics remedy to a loss in tenants' social welfare caused by a residential property with a grave?

Consistent with the economic theory of consumer behaviour, four hypotheses are set to guide the analysis. They are predicated on the principle of bounded rationality, which a household applies to choose a residence among several alternatives. First, the study hypothesize that the suitability of a residential location for daily activities has no significant relationship with the possibility of renting a property with a grave. Second, the study conceives residential property as a consumption good with an element of social inclusion. It hypothesizes that income has no significant relationship with the desire to continue occupation of a residential property with a grave. The third hypothesis also trails the path of bounded rationality. It hypothesizes that education has no significant influence on possibility of renting a residential property with a grave. Lastly, the study hypothesizes that family size has no significant effect on a tenant's decision to remain in current home if a grave were suddenly located on it.

The entire research objectives are set to gather empirical data, which provide answers to the research questions and the stated hypotheses. The first objective of the research attempts to uncover tenants' residential choice and perception to a home with grave. It attempts to answers the questions on the influence of a grave on tenants' residential choices and the rationality of such. The purpose is to approve or disapprove the proposition of the conceptual framework for the research's context. The conceptual framework "Random Utility Model" conceptualises that a household would apply a comparative judgement to choose the best when faced with discrete choices subject to a budget constraint. This helps to uncover whether or not the residential property market is operating within the confines of its regulatory mechanism to deliver a home that protect tenants' social welfare.

The second objective seeks to quantify the importance of a grave among other home attributes to tenants' residential choices decisions. This objective is inspired to answer the second question raised on the impact of a grave on tenants' residential choice. In addition, it finds out the trade-off a tenant would make among different attributes of a residential property. The third objective attempts to assess tenants' WTP for a residential property with a grave. The purpose is to quantify the monetary loss in market rent on a property with a grave. Largely, this helps to show that the location of a grave on a residential property has an adverse effect on tenants' and rental value.

The fourth objective examines tenants' sensitivity and tolerance to the location of a grave at different parts of a residential property. The rationale behind this objective is to answer the question on the adequacy of the market approach to an externality of a grave on a residential property. The objective discusses the impact of view on the possibility of renting a home with a grave. Lastly, objective five is cast on the legal implications of the location of a grave on a residential property. Its intent is to foster the development of an environmental health law that protects tenants' socio-economic welfare. In sum, each of the five research objectives is unique; however, they provide a synergy towards answering the questions on the negative externality of a grave and tenants' residential property choices in the informal market. The study employs stated choice methodological approach to analyse the impact of a grave on tenants' residential choice, rent, and social welfare.

9.3 Tenants' Residential Choice

As posited by the conceptual framework, the property market presents tenants with home options. The framework conceptualises every tenant as a rational being operating within certain budget constraint. With these assumptions, every tenant makes the best choice of a residential property among the given alternatives. For easy grasp of the understanding of tenants' residential choice, this section discusses the findings from two perspectives in subsections 9.3.1 and 9.3.2.

9.3.1 Tenants Residential Choices from Descriptive Data

This subsection discusses tenants' residential choices from the descriptive data. The discussion revolves around tenants' new choices if property owners suddenly locate a grave in their current homes. To begin with, tenants were asked about their general perceptions concerning the location of a grave within a residential property to assess approval of the practice. Findings reveal that 66.7 percent do not support the location of a grave within residential properties. Only 1.7 percent of the respondents are in support of such practice. Furthermore, 13.3 percent are indifferent to it, while 18.3 percent state that people should be allowed to locate a grave wherever they prefer. The high level of disapproval of a grave's location within a residential property is indicative of a tenant's possible choice and the welfare effects of such practice.

For instance, 78.3 percent claim that the location of grave on a residential property will affect their welfare. This cumulative effect divides into four main types. Firstly, 27.0 percent of the tenants would have a psychological effect due to the location of graves in their residence. A 25.0 percent of tenants who noted that the location of graves in their dwellings would affect their thought process follow this while 17.7 percent could not simply explain the horrible effect of the sight of a grave in a residential property. While 8.7 percent says it would affect the level of aesthetic desired in a home, 21.7 percent state that the location of graves in their homes would have no negative effect on them.

Reflecting on the impact of the externality of a grave, tenants' reactions to a sudden location of a grave on current dwellings is evident of their residential choices. In all, 67 percent of the tenants choose to move home to avoid graves in their homes. This comprises of two categories of respondents; the first category represents 34.3 percent of the tenants who will endure the sudden location of graves within their residential properties for the unexpired term of their lease and move home afterwards. The second category includes a group of respondents who are rather embarrassed by such incidents. They would react sharply to the location of graves within their current home by moving homes before their tenancy periods expire; they represent 32.7 percent. The findings imply that 67 percent of the tenants would be displaced and compelled to new residential property choices. This answers the first question raised on the impact of graves on tenants' residential choices.

Further, as revealed by the tenants' opinions on the location of a grave within a residential property, inferences show that most tenants prefer it without a grave. This choice is consistent with the principle of choice by bounded rationality put forward by the conceptual framework. While this assumption holds, it is intriguing to uncover the reason why some tenants may operate outside bounded rationality by making a choice of a residential property with a grave. With this in mind, the discussion on the residential choices of different income groups in the study follows.

The first group is the high-income group; findings reveal that 13.70 percent of the tenants in this category would continue to reside in a home with grave for as long as they wish to stay. The second group comprises of the middle-income group; the findings show that about 26.62 percent of them would continue their tenancies regardless of the location of graves in their current rented residences. Thirdly, nearly half of the low-income tenants (43.94 percent) would continue to reside in a residential property with a grave. Although the immediate reason for this is unknown, it is evident that the low-income tenants would be mostly affected by the negative externality of a grave. In the light of this, four hypotheses discussed below provide further insights into the understanding of the possible influence of some socio-economic variables on tenants' residential choices.

Four hypotheses are stated and analysed in section 7.13 to explain some variables that may affect the rationality of tenants' residential choice. The first hypothesis reveals that there is no significant relationship between a suitable residential location and the decision to reside in the current home if a grave were suddenly located on it. The second hypothesis assesses the influence of income on tenants' residential choice behaviour (see sub-section 7.13.2). The chi-square statistics results confirm a significant relationship between income and the desire to continue tenancy in a current home if a grave is suddenly located on it. Consequently, inferences show that the higher the income, the lower the possibility that a tenant will choose his current home if a grave is suddenly located in it and vice-versa. The third hypothesis evaluates the influence of education on the tenants' residential choices. The result shows that there is a significant relationship between education and tenant's decision to continue occupation of the current home if a landlord suddenly locate a grave within it; therefore, the null hypothesis is rejected. For the fourth hypothesis, the finding reveals a significant relationship between family size and the choice of

tenant's current home if a grave is suddenly located within it. As shown in Figure 7.10, 50 percent of the tenants with a family of 7 and above would continue occupation of their current homes though impacted by graves. Interestingly, most of the tenants with large family sizes fall into the category of respondents with low income. Conversely, the reverse is the residential choice of tenants with a small family size; most of them fall within the middle and high-income groups. Consequently, the income factor takes effect in a positive direction to determine the choice of an un-impacted new home if a grave is suddenly located in their current homes.

9.3.2 Tenants Residential Choices from Stated Preference

This subsection discusses tenants' residential choices based on the findings from their stated choices. Tenants were asked to choose from a set of residential properties prepared in accordance with market reality and local circumstances. The question was designed to elicit information on tenants' choice of new homes if they are looking to rent without duress. The discussion here focuses on parameter estimates derived from the two models applied in the study. First is the multinomial logit model; this model measures consumer choice by the effects assigned on each variable level. By virtue of the conceptual framework for this study, the utility derived from a residential property reveals tenant's choice. A tenant's residential choice depends on the trade-offs of attributes in the discrete choice questions.

An estimation of this model shows that a residential property without a grave has the highest effects with a value of 1.9726. This implies that most tenants prefer a residential property without a grave. Following the most popular choice of property is a residential property with a grave at the backyard. The estimation shows that a property with a grave in the backyard has the highest effects (0.1177) among all the properties with graves. This implies that it is the most preferred choice option among properties with graves. An effect of -0.1837 on a residential property with a grave at the frontage follows those with it at the backyard. A residential property with a grave at the side produces an effect of -0.25786 but less attractive than the one with a grave at the frontage. Similarly, a residential property with a grave in a room has -1.64865 effects and the highest negative value, which is as high as the positive effect estimate

for a home without grave. This implies that a residential property with a grave in a room is the worse option and a rare choice to tenants.

Attempts to overcome the Independent Irrelevant Alternative problem of the MNL model led to further analysis of the tenants' residential choice using HB model (see section 8.4). The estimation of the choice parameters from the HB model produces consistent results with the MNL model estimation. A residential property without a grave is the most preferred choice; it represents 163.14 among the variable levels (See subsection 8.4.2 in chapter 8). However, among the properties with a grave, those with it at the backyard are the most preferred by respondents as it generates an average utility of 15.47. The choice of a property with a grave at the side, which produces -27.50 follow this. For a residential property with a grave at the frontage and a room, a utility of -41.22 and -109.89 is obtained respectively.

In sum, this section presents a discussion on tenants' residential choices in an informal market with growing cases of residential properties with graves from two perspectives. The findings show tenants' preference for the choice of a residential property without a grave. Inferences from both MNL and HB model estimations consistently reveal that most tenants traded-off other residential attributes to have this choice. It reveals that tenants residential choice is mainly conceptualised from the perspective of prospect theory and loss aversion; thus confirming the validity of the conceptual framework for the study. This finding is consistent Walker et al. (2002) in a study of tenants' residential choices in the public housing sector in England. They note that most tenants prefer un-impacted homes to impacted ones with a large rent discount. The next section advances the discussion by reflecting on the importance of each attribute to tenants' residential choices.

9.4 Average Importance of Attributes to the Tenant's Choice

The last section discusses tenants' residential choices under two different circumstances. This section discusses findings on the importance of each attribute to tenants' residential choices decisions. It evaluates the contribution of each attribute by assessing the trade-off made by tenants to arrive at a residential choice. The findings from the HB model's estimates show that a grave is the most important attribute affecting the respondents’ decision to rent a residential property. It

represents an average importance of 48.21 percent among the variables affecting their choices of residential property. This is so because a residential property without a grave has the highest utility among all the estimated parameters. Rent ranked next to the most important factor on the attributes' importance profile. Consistent with the important element of the conceptual framework, tenants operate within certain budget constraint, which determine their choices. Therefore, rent contributes an average importance of 15.29 percent to respondents' residential choices decisions. Perhaps this would have been the most important attributes in a residential property market where properties are without graves.

Comparing the results obtained on the average importance of variable to a residential choices' decisions in Table 8.16, it is evident that the parameter estimates are consistent and reliable with particular reference to the two variables of interest namely; grave and rent. The former remains the most important to residential choice decision from both main choice and fixed choice model estimations. The latter occupies the second position from both estimations. However, the fixed choice estimation shows that a marginal difference exists between the contributions of the two attributes to residential choices. While grave contributes 21.99 percent to tenants' residential choice, rent contributes 21.95 percent to it. This implies that as other attributes become better the emphasis placed on the most important attribute spread over others. Worthy of note is the building services that moved up from fifth position in the main estimation to a third position in the fixed choice estimation. The implication is that as most households are currently responsible for the provision of water and electricity, it is less important than many attributes. However, with the emergence of a more efficient residential market depicted by the fixed choice questions, tenants prefer to purchase electricity and water from service providers.

A room’s size and ventilation occupies the third position on the attributes' importance profile. It contributes an average importance of 13.51 percent to the possibility of choosing a residential property. The position of the attributes importance to the choice process is understandable, as tenants tend to take advantage of adequate room size and natural ventilation. This becomes very crucial in the absence of constant power supply for operating an air-conditioning system in the hot tropical weather of Akure.

Fourthly, the estimates show that compound size and fencing has an average importance of 9.55 percent to respondents' residential choices decisions. Fifthly, building services has an average importance of 7.94 percent contribution to the choice of a residential property made by a tenant among a set of available options with varying attributes. Surprisingly, accessibility has an average importance of 5.50 percent in the residential choice decision. It is the least inspiring attribute among the six attributes that constitute the residential choice task design. The insignificant relationship between suitability of a location and the choice of a residential property with a grave (see subsection 7.14.1) strengthens the finding. According to Lee et al. (2010) most of the foremost studies theorize location's accessibility as a principal determinant of households residential choices. Recent studies in this direction are extensive and with mixed results. Accessibility has positive explanatory variables but their impacts on residential choices are secondary and confounded by other dwelling and neighbourhood characteristics (Srour et al. 2002; Blijie 2005; Zondag and Pieters 2005). The finding of this study is line with this growing list of literature with empirical findings that work and non-accessibility is gradually becoming insignificant on residential choices decisions.

This section evaluates the importance and contribution of residential attributes to tenants' homes choices decisions. Findings reveal that grave is the most important attribute in the residential choice process. This implies that the grave's attribute (and levels) is the most important factor to ponder for a tenant who is looking to rent. This appears strange, however, with recourse to the massive preference for no grave variable level as discussed under objective one, it is emphasized that the grave's attribute draws from this parameter estimate to achieve its status on the importance profile. Drawing from the findings in this section and the tenants choices in the first objective, the next section discusses the potential loss in rent as expressed by WTP for residential properties with graves.

9.5 Willingness to Pay on Residential Property with a Grave

In line with the proposition of the conceptual framework, households adopt a compensatory process to make a residential choice subject to budget constraints and bounded rationality. The WTP estimates in the context of this research reflect the

impact of a grave on rent. To arrive at tenants' WTP, two models namely, the MNL and HB models. Five parameters are estimated on the grave's attribute in the two models.

Firstly, the estimation from the MNL model shows that a 20 percent discount for residential property with a grave has the highest utility with a corresponding effect of 0.5962. An effect of 0.3800 obtained on 15 percent discount for a residential property with a grave follows this. Next to this, is 0.1575 effect obtained for a 10 percent discount. The lowest effect "-0.1898" is obtained on a 5 percent discount.

Secondly, the HB model estimates of tenants WTP for a residential property with a grave extends the discussion. This model describes the WTP by measuring the utility ascribed on each variable level. The result from the HB shows that a 20 percent discount produces the highest average utilities among all the variable levels. Next to this, the model estimation shows a WTP 15 percent discount on a residential property with a grave produces 16.9003. WTP 10 percent less than the open market rent of a residential property with a grave follows this. It accounts for a marginal value of 1.2370. For WTP 5 percent less than the open market rent of a property with a grave, the model estimate shows a negative utility value of -19.5300.

Comparing the WTP estimates for a property with a grave from both models, firstly the observation shows that a positive sign is ascribed on model estimates for WTP 20, 15 and 10 percent less than the market rent. While the WTP estimates are significantly large on 20 and 15 percent, it is marginal for a 10 percent discount. With evidences of consistent parameter estimates from both models, the general implication is that a residential property with a grave will lose between 15 and 20 percent in the market rent. Using the fixed choice for internal validation, estimates show that a property with a grave will lose up to 15 percent in rent (see Table 8.15).

9.6 Households Sensitivity to Changes in Rent

This objective examines respondent's elasticity of demand to varying rent discount on a residential property with a grave at the frontage, side, backyard and in a room. The objective is explained by analysing the responsiveness of respondents to a change in rent in a bid to answer the question on the adequacy of neoclassical

economics solution to the negative externalities of graves in homes. Subsections 9.6.1 to 9.6.4 discuss the findings on tenants' sensitivity to rent discount with respect to the location of a grave in four different parts of a residential building

9.6.1 Respondents' Sensitivity to a Property with a Grave at the Frontage

Every landlord tends to look forward to receiving the full market rent on a property available to let. Hence, the study assumes that the owner of a residential property with a grave will ask for an open market rent payable on a comparable property without grave. With this concept as the market attitude of private landlords, tenants disposition to residential properties with a grave without a rent discount is assessed. The sensitivity of respondents to a residential property with a grave without any compensation is taken from the y intercept. This describes the elasticity of utility to zero rent discount on a residential property. With a grave at the frontage, an elasticity of -4.60 is obtained, this is greater than 1 in absolute terms. This shows that the demand for a residential property with a grave at the frontage is elastic to a zero change in rent. The implication of the negative sign shows that tenants would move homes from such residential properties while potential tenants would turn down a choice of such homes. Hence, a residential property with a grave at the frontage may take a longer time to let, as many tenants would reject it if there were no discount. The implication is that as choice is fundamental to the analysis of future demand, high vacancy rates may possibly occur in the long run.

For a 5 percent discount in the full market rent of a residential property with a grave at the frontage, an elasticity of 1.10 is obtained. This implies that a change in the market rent of a property with a grave at the frontage by 5 percent discount would lead to a commensurate increase in the number of tenants willing to rent. For a 10 percent discount in rent, the responsiveness of tenants to this change is 2.11, meaning that demand is elastic on a residential property with a grave at the frontage. Conversely, a further increase to 15 percent discount in rent produces an elasticity of 0.29, which shows that utility is inelastic to rent on a property with a grave at the frontage. Surprisingly, with a 20 percent discount in rent, tenants' responsiveness tends to be elastic once again. Demand for such a residential property produces more than a commensurate increase in demand with an elasticity value of 1.09.

The observation shows that respondents are elastic to all but one rent variable in absolute terms. Tenants are insensitive to 15 percent discount in rent; conversely, sensitivity to 20 percent discount in rent is higher but lower than the sensitivity on 10 percent. This implies that a residential property with a grave at the frontage is likely to lose 10 percent in its open market rent. Tenants' sensitivity behaviour shows that there is no transitivity of preference for rent discount.

9.6.2 Sensitivity of Respondents to a Property with a Grave at the Side

For a property with a grave at the side, tenants' sensitivity expectedly shows that a zero discount in rent leads to an elasticity value of -3.37. This implies that an attempt to let a residential property with a grave at the side at the open market rent payable in its an un-impacted state would lead to a massive boycott. Tenants' sensitivity to 5 and 10 percent discounts in rent on a residential property with a grave at the side is elastic and at par. Each of the attribute levels produces an elasticity of 1.15. Conversely, demand on a similar type of property is inelastic to further increase in rent discount to 15 and 20 percent as 0.87 and 0.73 elasticity are observed on them respectively. The implication of these values is that a reduction in the open market rent of a residential property with a grave at the side by 15 and 20 percent do not produce commensurate number of tenants willing to rent. Therefore, the nature of sensitivity of tenants to rent discount here shows that tenants are not motivated to rent a residential property with a grave by virtue of the huge rent discount.

9.6.3 Sensitivity of Respondents to a Property with a Grave at the Backyard

For a property with a grave at the backyard, a zero discount in rent obtained from the coefficient of β_0 shows a positive elasticity. However, the sensitivity is inelastic with a marginal value of 0.16. This implies that the respondents are barely motivated to rent a residential property with a grave at the backyard without a reduction in rent to compensate for the negative externality. Similarly, tenants' sensitivity shows a slight improvement with a 5 percent reduction in rent with an elasticity of 0.27. Further, the elasticity tends towards unity with an increase in rent discount to 10 percent as tenants are 0.86 sensitive. Surprisingly, tenants' sensitivity to 15 and 20 percent discount in rent show a sharp decline; a sensitivity value of 0.49 and 0.34 are obtained on both discounts respectively. One consistent finding on tenants'

sensitivity is that the entire beta coefficients (elasticity) are positive. The implication of this finding is that tenants' are somewhat tolerant to a choice of residential property with a grave at the backyard. Similar to tenants' sensitivity to a rent discount in different locations of a grave within a residential property, inferences show that there is no direct relationship between the magnitude of a rent discount and elasticity value.

9.6.4 Sensitivity of Respondents to a Property with a Grave in the Room

For a residential property with a grave in a room, the findings show that respondents are highly sensitive to any attempt to let it with no discount but in opposite direction. An elasticity of -9.48 is obtained; this implies that if an owner of a residential property with grave in a room insists on letting his property at the same rent it would command in an un-impacted state, respondents responsiveness would lead to a massive boycott of such a property. The inference suggests a massive letting risk in such a residential property. Similarly, a discount of 5 and 10 and 15 percent rent discounts produce elasticity of -0.89, -0.76 and -1.42 respectively. While tenants' sensitivity to 5, and 10 percent are inelastic in a property with a grave in a room, it tends to be elastic with 15 percent rent discount but in a similar direction. Conversely, respondents' sensitivity to 20 percent rent discount is relatively inelastic with a positive elasticity value of 0.53. The inference gathered from respondents' sensitivity to a rent discount shows that a property with a grave within the room might lose close to 20 percent in the rental value. However, the sensitivity to this discount level does not produce a commensurate increase in demand expected with a reduction in the price of an inferior good.

The synthesis of findings on tenants' sensitivity to rent discounts broadly confirms heterogeneity in consumer choice behaviour; it reveals the influences of other attributes preferred to a reduced rent in a home with a grave. The general inference shows that there is no direct relationship between a rent discount and tenants' residential choices. Insensitivity to a huge rent discount on a residential property with a grave reflects its inadequacy to compensate for a loss in tenants' social welfare. This finding addresses the question on the adequacy of neoclassical economics approach to a negative externality in the residential property market, which is discussed in section 10.3. It disapproves the current perceived adoption of

neoclassical stance, which theorises the solution to the negative externalities of a grave on market dictates. This finding is consistent with Steinacker (2006) who notes that financial compensation is not an acceptable solution to negative externalities in the residential property market. He argues that most neoclassical approaches fail to acknowledge problem's definition and that solutions are contingent on people's acceptance. Against this backdrop, the study seeks recourse from appropriate solution that affirms the legitimacy of every land use practice and protects tenants' social welfare. Extending this argument, section 9.7 delves into government intervention in the residential environment; it examines the environmental health law and the agencies that are saddled with its enforcement.

9.7 Legal Implication of the Use of a Residential Property for a Grave

This objective examines the legal implication of the use of a residential property for a grave. Government intervenes in the residential property market by law through the agencies that are charged with the implementation of its provision. Two major government establishments namely Ministry of Lands and the Environmental Health Office were contacted for data collection on this objective. The Ministry of Lands deals with land allocation and development control. The finding reveals that the ministry has no direct responsibility of preventing the location of a grave in residential property. The contact person in the ministry said:

> *Although, the phenomenon of grave is highly prohibited on State's land, however, on informal residential estate, perhaps the ministry would begin to act when it reaches a crisis level.*

On the other-hand, the State Environmental Health Agency is inter-alia, charged with the responsibility of preventing the location of grave on residential property in Akure. Similar to other States in Nigeria, the agency operates on a public health law that is rooted in the national public health law. The public health bye-law provision in section 3 of the Burial on Private Premises Regulation Cap 124 Vol.3 of 2006 laws of Ondo state, stipulates that:

> *No corpse shall be buried in or any private premises unless the disease was by customary law entitled to be buried thereon and the person responsible*

for burying the corpse has obtained a written authorization from a Health Officer for the burial of the corpse.

The inferences on the provision of the law show ambivalence and lack of sufficient definiteness for the exception to the rule. The law allows burial of a deceased in residential premises for those permitted to do so under the customary law. However, the law is silent on the class of people who are by custom entitled to locate their graves on residential properties. Hence, it seems that the definition of those exempted is at the discretion of property owners. In addition, the law also allows permission to be sought to locate a grave within a residential property based on approval of the environmental health officer. The implication is that compliance with this law is rendered voluntary. The cumulative effect is that a tenant whose landlord decides to locate a grave in a residential property may think that permission has been sought or he is entitled to do so by virtue of customary law.

Against the backdrop of an ambivalent legal context on the prohibition of a grave in private premises, the study examines the structure that facilitates compliance with the provision of the law. The structure is conceptualised in terms of land allocation for cemeteries and the required workforce to ensure that the location of a grave is confined to it. The findings reveal that only one public cemetery is available in Akure. It is approximately about five acres in size and not generally available to the public. The cemetery is reserved for the interment of unidentified corpses, lunatics and people that die of AIDS and other strange illnesses. The cemetery has been overgrown by weeds and largely unkempt. Sadly, applications for more cemetery land that would be open to the public were not approved. While the inadequacy of public cemeteries is a problem in Akure, the observation shows no working relationship between the two government agencies that would have helped the situation. For instance, while the Ministry of Lands absolve itself from any direct involvement in the prevention of the location of a grave in informal residential estates, it could allocate more land for public cemeteries to alleviate the incidence of such practice in homes.

With regards to the manpower that is responsible for enforcing the law, findings show that only 12 environmental officers are employed to oversee the residential environment of about half a million people. This number is inclusive of the Heads of

Departments, Desk officers and Field workers. The number of staff is obviously inadequate; hence, a major constraint to what could be enforced to ensure compliance with the law.

9.8 Conclusion

This chapter presents a discussion on the major findings on the research objectives. In specific terms, it discusses tenants' residential choices and notes tenants' preferences for residential properties without graves in an informal market with alarming cases of homes with graves. It provides a synthesis of findings on WTP for impacted properties and sensitivity to a rent discount. While a significant loss in rental value is discovered on residential properties with graves, tenants are not generally disposed to the opportunity of a huge discount. Government interventions on the phenomenon were reported to assess its effectiveness and impacts on the informal residential market. Drawing from the discussions in this chapter, the last chapter summarizes the findings with a direct engagement on the research questions.

Chapter 10
Summary of Findings and Policy Implications

10.1 Introduction

This chapter summarises the findings on the specific objectives of the study. It reflects on the research findings to present a discussion that engages the research questions. The chapter contains seven content specific sections. Section 10.2 presents a recap of the study, which summarises all the chapters. The specific implications of the study's findings follow this in section 10.3. In Section 10.4, it discusses the contributions of the research to the body of knowledge while section 10.5 discusses novelty of the research. Section 10.6 highlights the major limitations of the study. The last section looks beyond the achievement of the study to wider issues surrounding its context and provides an agenda for future research opportunities.

10.2 Summary

The aim of this research is to develop a choice model that offers an empirical and theoretical understanding of the externality of a grave on tenants' residential choices in the informal market. Five objectives are set for the achievement of the broad aspiration of the research. The study context is Akure in South-Western Nigeria. However, the study cast a wider reflection on international context characterised partly by the growing informality in the residential markets of developing countries on one hand and a specific focus on the impact of a negative externality on rent and residential choices on the other. The study was inspired by the codification of access to decent residential housing as the right of every household, which lay enormous pressure on every nation to the achievement of residential environment that protects social welfare and value. The study applies a growing SP research method "choice experiment" to achieve its aim.

In all, the thesis consists of ten content specific chapters. Chapter 1 presents a discussion on the study background with specific reference to; statement of the problems, research questions, aim and objectives. Chapter 2 presents a review of key

concepts in land administration and management. It starts with a discussion on the functions of land administration and the principles set to achieve them. It touches upon the tenure system that defines who owns what and the term. The discussion is expanded to explore land use policy and development control with a particular reference to Nigeria. The chapter observes a uniformity in land administration functions, however, its system varies from place to place. It notes a gap between the functions and current achievement of land policy and development control in Nigeria.

Chapter 3 explores the gap discovered in chapter two to present a critique of literature within the specific context of the Nigerian property market. It starts with a discussion on the study area. It progresses with a theoretical review on the property market efficiency and conceptualises the Nigeria residential property market from the purview of purpose efficiency. The chapter examines man land relationship to provide an insight into the understanding of the land market, which is dominated by the informal sector. Transactions in the informal sector are largely unregulated, hence, the leeway to many land use practices that often culminate to negative externalities. The general housing market exhibits a paradox of two cities in one; the informal market is dotted with the phenomenon of homes with graves, while the formal market is without residential properties graves.

Chapter 4 dwells on the concept of a negative externality. It conceptualises the location of a grave within the residential housing as a source of a negative externality and provides a review of social media discourse on cremation as an alternative to it. It theorises negative externalities from neoclassical economist and social point of view. The neoclassical economist solutions to negative externality de-emphasizes government intervention and lack welfare content, this limit the relevance of its wider applications where households' health and social welfare is at risk. Planning approach to solving negative externalities encompasses social value; however, its goals have been truncated in Nigeria. Lack of political might to acquire land for essential services such as cemeteries and other factors leaves a gap between the potential benefits of planning and the current nature of the study area.

In chapter 5, the study presents a review of the empirical assessment of the impact of negative externalities on residential choices and values with a focus on the

application of RP and SP approaches. It notices a large application of hedonic pricing model in the assessment of the economic value of negative externalities, however its relevance is limited to availability of historic data. The studies provide dissenting opinions on the impact of negative externalities (such as CAFO, cemetery, noise and air pollution) on residential property value and choices. This leaves a knowledge gap in the literature with regard to the possible impact of residential property with a grave on rental and household home choices. The chapter discusses the conceptual framework that guides the study. The chapter notes that economic theory underlying non-market valuation is based on neoclassical economics of consumer theory and choice. As conceptualised by utility maximization model, it reveals that households are maximizers who operate on bounded rationality to make a residential choice that offers the highest benefits among different alternatives. It specifies the conceptual paradigm explaining specifics of the residential choice context of the study and the generic compensatory choice framework process. It presents a discussion on the model specification with specific reference to Random Utility Model, which guides utility function and households' WTP.

Chapter 6 dwells on the methodology, and starts with a discussion on the research design. A discussion on the pragmatic research philosophy adopted in the fact-finding mission follows this. The research method is mainly quantitative with a blend of some qualitative elements. The strategy of inquiry comprises of both survey and experimental approach. The chapter discusses the target population, sample size and the quota technique applied for collection of the sample. It delineates the scope of the research within the objectives set to examine the residential properties with graves in the informal market renter sector in Akure. The chapter presents a detail discussion on the specific SP method adopted for modelling tenant residential choices. It notes that two SP methods could be applied, however choice experiment is preferred to CV method due to its consistency with consumer theory. The chapter discusses the experimental design algorithms. It highlights the advantages and methodological issues of the SP approach and discusses the validity measures applied in the study to establish reliability of model estimates.

Chapter 7 dwells on the presentation and analysis of the descriptive data. The analysis dwells on tenants' responses to the questions on the location of a grave in their current homes. Chapter 8 presents and analyse the stated choice data while

chapter 9 discusses the findings on parameter estimates of specific research objectives. Chapter 10 presents a summary and the policy implications of the study. It specifies the contribution of the research to the existing body of knowledge and provides an agenda for further research opportunities.

10.3 Summary of Findings, Implications and Recommendations

This section reflects on the synthesis of findings on the research objectives to provide a discussion, which directly engage the research questions. It dealt with four interacting questions. To begin with, the study seeks to answer the question on the impact of negative externality of a grave on a tenant's residential choice. Secondly, it seeks answers to the question of whether the location of a grave within a residential property leads to significant loss in rental value. Thirdly, the question as to whether the Burial on Private Premise's law is efficient to deliver homes with the element of social welfare to tenants is addressed. Fourthly, the study seeks answer to a question on the adequacy of neoclassical economics solution to the negative externality of a grave on a residential property. These questions are considered important to the need to protect; namely the social welfare of the people with limited property rights, the essential functions of the residential property market and its' regulatory mechanism.

Despite the preference for a home without a grave, the first question asked in the study seeks to find out the effects of graves on tenants' residential choices. The implications of the findings that answer this question are in two folds. First, 67 percent of the tenants will move homes against their wilful choice if graves are suddenly located in their current homes (see figure 7.4). This effect emerges from the psychological, horrible, unexplainable and aesthetic effect of a grave on 78.3 percent of the tenants (See figure 7.3). Second, the implication of the untimely decision to move homes shows that there is no guarantee to tenants' security of tenure in the private renter sector. Extending this argument, the finding reveals that the resultant tenure insecurity is with a low income skew. Most of the low-income group, specifically 43.9 percent are constrained to live in a residential property with a grave while 26.5 percent would sacrifice their social welfare for the unexpired term of their tenancies and move homes as soon as they expire. Unfortunately, the tenants' social welfare may be sacrificed for a year as 83 percent of the sample population are

on yearly tenancies. Conversely, most tenants with high and middle income are able to move homes if a grave is suddenly located on their current homes (see Figure 7.5). The findings on the effect of a grave on tenants' residential choices is consistent with Wallace (2012) and Fitzpatrick & Pawson (2011) who note that tenants may be forced to move if the psychosocial attribute of their homes is affected or there is a proven moral concern.

The findings show that the grave factor is the most important variable affecting tenants' residential choice decisions (see Table 8.14 in chapter 8). The no grave variable level plays a significant role to accord it this status on the attributes importance profile. A location with accessibility advantage to work and local services has a relatively low significant impact on tenants' residential choices. This implies that most tenants would generally not trade-off a choice of a residential property that guarantees social welfare for accessibility advantage and cheap rent on a property with a grave. This finding strengthens the robustness of the previous studies that tend to de-emphasize accessibility as the most important attribute affecting households' residential property choices.

Concerning the question on whether the externality of a grave in home leads to a significant loss in rent, two major implications depicting the complexity of the residential property market emerge. These implications emanate from the current reality in the market and the fixed choice questions. Firstly, from the estimated WTP on current market realities, estimates show that a residential property with a grave would lose between 15 and 20 percent in the open market rent. Estimates show that the possibility of a 20 percent loss in rent on a home with a grave is higher. Secondly, from the fixed choice model estimates, all things being equal, if the residential market offers properties that are attractive in terms of all other attributes but with a grave, a residential property will lose between 5 and 15 percent in the market rent. Estimates show that the possibility of losing 5 percent is higher.

Concerning the location of a grave at different parts of a residential property, the findings reveal a differential loss in rental value. Tenants tend to prefer the choice of a home with a grave at the backyard, hence the lowest loss in rental value (5 percent) on it. The inferences show that the reason for this is perhaps the infrequent view of such a grave by tenants whose frequent point of call revolves around the frontage

and the room of their residences. This finding is consistent with the study of Coleman & Larsen (2010), which shows that view has a significant impact on the choice and sales' value of homes where nearby cemeteries are visibly seen in Portland. The estimated tenants' choice in this study and previous studies tend to answer the obvious question on the rationality of tenants choices among a set of good and bad alternatives residential properties.

Generally, the implication of the significant loss in market rent is a reduction in the stream of income derived from rent. This will in turn reduce the ability of a property to finance itself by way of producing enough income for maintenance cost, debt service and returns on investment. Similarly, the vacancy rate and letting risk on residential property with a grave would increase significantly as tenants' economic status improve and marked improvement on other variables. The HB model estimate from the fixed choice data shows that WTP 10 percent above the open market rent has the highest utility estimate (see Table 8.15). This implies that since the majority of the tenants are not willing to take the advantage of 20 percent rent discount, a residential property with a grave may lose more if there are no deficiencies in other residential attributes. Against the backdrop of the significant loss in the rental value of a residential property with a grave, the study explores answers to the question on the adequacy of the Burial on Private Premises Law.

The third question bothers on whether or not the Burial on Private Premise's Law is adequate to prohibit the location of graves on residential properties. The residential property market offers tenure options with which individuals can have access to homes. Tenants have access to residential properties through formal and informal market, regulated by a generic Burial on Private Premise's Law and other environmental health regulations. Surprisingly, cases of residential properties with graves are exclusively restricted to the informal market. Unlike the formal property market, the restrictions and quantum of rights transferred to a property owner in an informal land market are undefined at the point of purchase.

Irrespective of the nature of the property market, the Environmental Health Law in Akure intends to ensure social order with respect to the prohibition of graves on residential properties. However, the ambivalence and lack of definiteness in the Burial on Private Premises Law renders it inefficient and somewhat hypothetical.

The law makes a proviso for permission to allow the location of graves within residential properties. Even though property owners rarely seek permission, such proviso paved the way for voluntary compliance and discriminatory enforcement. In addition, the lack of definiteness in the exception to the rule with reference to those allowed by custom to use private premise for grave reduces the tenants' ability to apply the concept of Nimbysm to protect their social welfare. Exception is a commonplace in law for flexibility and other moral grounds, however, the findings challenge its appropriateness in this research context. According to Edgerton (1985), if laws are so important for creating and maintaining social order, why are exceptions to them? Exception to the Burial on Private Premise's Law weakens its adequacy to prohibit the hazardous use of residential properties for graves and renders both tenants and other stakeholders vulnerable to environmental hazards and psychosocial deprivation. The cumulative effect of the inadequacy of law is that tenants' social welfare is subject to market dictates.

Regarding the fourth question, the study seeks answer to the efficiency of the perceived neoclassical economics solution to residential properties with graves in Akure. In consonance with the general ideal of the conceptual framework and consumer theory of choice, the models' estimates reveal consistent massive preference for a residential choice without a grave. Sensitivities to rent discount show that there is no direct relationship between reduced rent and demand for a residential property with a grave. This finding is consistent with respect to the location of a grave in four different parts of a residential property. The implication of this finding is that most tenants are not keen on taking advantage of rent discounts. With specific reference to the maximum rent discount (20 percent), tenants' sensitivities are inelastic in three of the four locations of a grave within a residential property (see Figure 8.1, 8.11, 8.12 and 8.14 in chapter 8). They are rather willing to pay 10 percent above the market rent on a residential property without a grave if there are no deficiencies in other variables. This shows that most tenants prefer a residential property that optimizes their social welfare when they are looking to rent. Worst still, if a landlord attempts to let a residential property with a grave at no discount in rent, tenants' sensitivities to it at the four different locations are elastic but with a negative sign. This implies that most tenants who are looking to rent will reject such a property. According to Steinacker (2006), the appropriate solution to a

negative externality is contingent on people's acceptance. The implication of the poor sensitivity to rent discount in a residential property with a grave in this study shows that the neoclassical economics solution does not provide adequate compensation for loss in welfare. Most tenants would not sacrifice their social welfare for a monetary compensation.

Conceptualising the property market efficiency from purpose point of view, it is evident that neoclassical economics approach is inefficient to offer a pareto-optimality in the residential market. In addition, the market approach lacks the ability to prevent the location of a grave in a residential property. Although the formal market is without residential properties with graves, the inability to replicate this characteristic in the informal sector points to inefficiency of the residential market. While the formal market appears as good a model, advocacy for a formal residential property market that covers the city and the nation at large is not practicable. Government attitude to the acquisition of more land, poor commitment to current acquisition and her current stance, which de-emphasizes direct involvement in residential supply affect the size of the formal market. The implication of this is that the future of the city is largely tending towards the domination of the informal market. Consequently, the preponderance of residential properties with graves would continue in the informal residential estates of the city if the Environmental Health Law remains inefficient.

In conclusion, the study reveals tenants' preferences for residential properties without graves in Akure. It reports a significant loss on rental value in residential property with a grave. While a massive preference for a residential choice without a grave is stated, its achievement across tenants of all income groups is locked outside the informal residential market. This calls for a reflection on the fundamental functions of the land administration principle with specific reference to "rights, restrictions and responsibilities" which dictate the characteristics of the residential property market. The questions as to the quantum of right held in land and restriction of use by property owners should be overhauled against the current practices in the informal residential property market.

Against the backdrop of obvious defect in the Environmental Health Law, the study argues for an urgent amendment to the Burial on Private Premises Law. To achieve

this, the image of the law should be conceptualised from social construction to remove any ambivalence. The law should stipulate unconditional prohibition of a grave in a residential property and provide sufficient definiteness for a rare exception, perhaps for Monarchs who have cemeteries in their palaces. This will facilitate unequivocal access to social welfare irrespective of the renter sector a tenant explores for a residential property choice. On this premise, the recommendation is a departure from exception to the rule, which is a commonplace in law. It queries the wider application of Holton's (2010) argument that exceptions prove the rule and insistent that whilst there is an exception the rule still stands. Exceptions in fragile environmental matters undermine the rule, particularly in the wake of Ebola Virus Disease (EBV), which requires safe interment of deceased victims in the West Africa Sub-region.

Similarly, the capitalist instinct of the public authorities to cemeteries and perhaps other service land uses needs to be orientated towards social welfare. A cemetery is the conventional approved location for graves and the most popular method for safe disposal of human remains in Akure and the country at large. However, alternative measures to graves such as cremation should be brought to fore for formal discussion. This is necessary to explore the inherent benefits over current practices affecting households' choice and property rent.

With reference to the ability to guide against the negative externalities of graves, the current nature of the residential property market shows that it is not purpose efficient. Tenants' property rights and social welfare are undermined. This is substantiated by the over 66 percent of the tenants who are unaware of their right in the residential market (see Table 7.8).

Further, one of the major global practices in tenancy relationship is the duty of care and assurance of peaceful enjoyment of rented properties throughout the lease period from property owners. Although this is a truism, it is often noticeable where an estate agent mediates to protect the interests of both parties. Unfortunately, the findings show that 52 percent of the tenants do not employ the services of estate surveyors. In the absence of an intermediary who is the closest arbitrator in case of a breach of agreements, a property owner can easily usurp the tenants' rights and locate a grave in his property. While, it is not out of place to negotiate a lease arrangement directly

with landlords, the study makes case for proper documentation of rights and restrictions from both parties. It advances a strong case for a tenants' right campaign and the possibility of exploring it through Not in My Backyard Concept to guarantee their social welfare and relative tenure security on any residential choice. In addition, the study recommends recourse to the Land administration system, which defines the rights, responsibilities and restrictions on residential land use in Akure. This should be prioritised to promote landlords' ethical commitment towards socially and legally permitted residential land uses.

10.4 The Research's Contribution of Knowledge

Following the achievement of the aim and objectives of this research, this research has made significant contributions to the existing body of knowledge. This is discussed under three agenda of evidence in subsections 10.4.1 to 10.4.3.

10.4.1 Contribution to Methodology

The methodology adopted in the research is largely popular in the developed world specifically, in the field of marketing and transport studies. While the application of this methodology in Nigeria and developing countries is scarce, its application best suits such immature property market with inadequate and reliable record of historic property data. The application of stated choice experiment method in this research provides a good reference point for future research in the study area where the reliability of historic data is doubtful.

10.4.2 Contribution to Literature Publication

The research adopts a conceptual framework known as Random Utility Model, and the findings satisfy its proposition of rationality of consumer choice amongst a set of products with varying attributes. It does not only validate this theory, it shows that tenants' social welfare is more important than a reduced rent. The study adds to the existing body of knowledge by revealing the tenants' intention to purchase their social welfare if the residential property market does not protect it. The estimation of tenants' choice from the fixed choice data shows that tenants are willing to pay extra 10 percent above the open market rent of a residential property without a grave when

all other neighbourhood and housing attributes are good. This contribution strengthens the robustness of previous findings on tenants' attitudes to cheap rent; particularly on a residential property with poor quality. It emphasizes the limitation of neoclassical economics approach to negative externalities in the residential property environment. A journal article published in the refereed Journal of Real Estate Literature and two papers presented at international conferences further substantiate the study's contribution to existing knowledge (see Appendices viii, ix and x).

10.4.3 Contribution to Policy Formulation

The study has shown the need for a clear-cut formulation of statement of intention in the use of property rights to protect social welfare of the populace. The current Environmental Health and Safety Law that prohibits the location of a grave in a residential property creates a room for voluntary compliance. The ambivalent nature of the law produces no meaningful impact on the efficiency of the residential market. Consequently, the research provides a major turning point for policy formulation that could enhance the efficiency of the residential property market. Secondly, it provides an insight into the need to revisit urban policy on land allocation for cemeteries and frequent usurpation of service land for other purposes.

10.5 Novelty of the Research

Studies on negative externalities are widely represented in the existing literature but most of the works are from the occidental. Similarly, most of the studies are largely inspired by natural occurrences and activities that are legally permissible, but create negative externalities, which affect residential values. In developing countries, although much has been discussed in literature on a wide spread informality of residential property development, only few research efforts have been made to examine the impact of negative externalities on households' residential choices and property values. Till date, despite the large volume of empirical studies on negative externalities in Europe and America, none of the studies has explored households' choices and WTP in residential properties with graves. Bolitzer and Netusil (2000) and Larsen and Coleman (2002) investigated the impact of cemeteries on residential

properties' sales value in Ohio. They relied on historic evidence of value and applied revealed preference methods in their studies. These studies and other informal publications coupled with the discourse on Nigerian social media offer a bit of information of people's attitudes to the location of graves within residential properties. They are good a point of reference to this investigation but are tangential to the focus of the study.

This research is a land breaking attempt at modelling tenants' residential choices in the PRS with a widespread of homes with graves and a quantitative effort to examine its impact on rental values. It provides an avenue through which some bit of valuable information in the discourse review and the broader agenda of this research can enter into formal publication.

Concerning the method applied, the research adopts a unique methodological approach "known as choice experiment" in its fact-finding mission. This method has been widely applied in the developed world with proven reliability of result, however, to date, there is no record of the application of such an approach in any of published materials in Nigeria. This research therefore provides an insight into a growing methodological approach suitable for choice modelling and economic valuation of non- market goods. It offers a good replacement for HP models and CV that are currently subject to heavy criticisms. Considering the taxonomy of the observed sensitivity to the location of graves in different parts of a property, the study contributes to the existing body of knowledge, which disapprove wider relevance of the neoclassical economic theory to solving the problems of negative externalities. It consolidates initial findings from few studies such as Walker (2002) and others that most households prefer a socially acceptable residential property than neoclassical theory of financial compensation for properties with some form of negative externalities.

Fundamentally, the research also makes useful contribution to the on-going debate on land reform and the need for clearly defined property rights for market efficiency. It highlights issues that are of significance to policy implications. For instance, it contributes to the fact that a free market cannot provide socially acceptable residential properties to the tenants. Hence, it strengthens the opinion on government

intervention in the property market and advocacy for a wider involvement to protect residential property choices and rent.

10.6 Limitation of the Study

The major limitation of this study is a failure to collect data from all the relevant stakeholders in the informal residential market. For instance, the roles of the property owners are unknown in the current market circumstance. If one of the contributions to knowledge is tenants' residential choices in an impacted market, its shortcoming is the inability to inquire the rationale for supplying grave impacted homes to the market.

Further, the methodological issues surrounding the research approach limit the achievements of the study. First, the reality of happenings on the field opposes the proposed random sampling method. It was impracticable to collect the data by random sampling as invitations to participate in the survey were turned-down by some tenants; consequently, the study resort to quota sampling. While the degree of limitation of such a method is generally unknown and perhaps negligible, there is no obvious evidence against wider applications of the study's relevance. However, the caveat for generalising the research findings across other cities with similar negative externalities is a reasonable caution.

While there are no perceived clues suggesting error in the reliability of the research findings, the general issues with experimental research method may persist. Reliability of data is the major criticisms of the previous applications of the stated choice experiment method. The study controls all methodological loopholes capable of affecting the reliability of the model estimates; for instance, the inclusion of a status quo option eliminates forced choices and strategic behaviour. With that, the research elicits reliable information on what respondents would choose in reality, but there is no absolute guarantee to commitment to the chosen option. Notwithstanding, this is an inherent methodological issue with experimental research.

10.7 Agenda for Future Research

This study deals with the negative externalities of graves located within residential properties. Specifically it examines the influence of such practice on tenants' residential property choices and market rent. While the study finds a significant impact of the influence of graves on tenants' residential property choices and rental values, some limitations to the study provides opportunities for further research on wider issues. For instance, a study with specific focus on the potential buyers' choice and the WTP for a residential property with a grave is a vacuum needing a research effort. The impact of graves on the sales value of adjoining residential properties provides a research opportunity for further empirical understanding of the subject matter. Similarly, from a wider perspective, it is unclear whether the location of a grave on residential properties is satisfactory to the property owners. Hence, from the property owners' point of view, a study on the choice of a residential property abutting another with a grave is a major gap for future research direction.

From a social stance, the impacts of the externalities of graves on neighbourliness, homelessness and communal spirit offer a veritable direction for further studies. Lastly, there is a need to examine planning politics and the local content of the environmental health law prohibiting negative externalities in the residential market.

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Appendix I.
Logit Estimate of Partworths.

Variable	Effect	Std Error	t Ratio
-5% discount	-0.36376	0.12831	-2.83510
-10% discount	0.15751	0.07313	2.15389
-15% discount	0.37995	0.07237	5.25010
-20% discount	0.59618	0.06663	8.94747
10% rent increase	-0.76988	0.10419	-7.38917
24 hours electricity and water supply.	0.20515	0.04999	4.10408
8 hours of electricity and water supply per day	-0.19534	0.05249	-3.72154
24 hours of electricity and 8 hours of water supply per day	0.14269	0.05005	2.85064
8 hours electricity and 24 hours of water supply per day.	-0.15250	0.05439	-2.80383
Grave at the frontage of the building	-0.18372	0.07435	-2.47099
Grave besides the building	-0.25786	0.07599	-3.39341
Grave at the backyard	0.11768	0.06897	1.70638
Grave within the room	-1.64865	0.15046	-10.95777
No grave	1.97255	0.05906	33.39739
Large compound no fence	-0.22134	0.05346	-4.14051
Large compound with fence	0.18113	0.04877	3.71371
Small compound with fence	-0.10930	0.05276	-2.07171
Small compound no fence	0.14950	0.04952	3.01895
15 minutes by bus to work and local services	0.04243	0.05130	0.82711

30 minutes bus to work and local services.	-0.13662	0.05218	-2.61819
15 minutes to work and 30 minutes to local services by bus.	0.00651	0.05131	0.12677
15 minutes to local services and 30 minutes to work by bus	0.08769	0.04993	1.75612
Double bed size room(s)(100 sq ft),cross ventilation	0.43283	0.04866	8.89529
Double bed size room(s)(100 sq ft,)no cross ventilation	0.00943	0.04993	0.18889
Single bedroom(s)(70 sq ft),cross ventilation	0.01034	0.05217	0.19821
Single bed size room(s) (70 sq ft),no ventilation	-0.45260	0.05610	-8.06778
-5% discount x Grave at the frontage of the building	0.13313	0.17892	0.74408
-5% discount x Grave besides the building	0.02045	0.18403	0.11111
-5% discount x Grave at the backyard	0.24374	0.17172	1.41944
-5% discount x Grave within the room	-0.72848	0.46897	-1.55337
-5% discount x No grave	0.33116	0.15396	2.15092
-10% discount x Grave at the frontage of the building	0.56050	0.12672	4.42308
-10% discount x Grave besides the building	-0.01620	0.14117	-0.11479
-10% discount x Grave at the backyard	-0.40897	0.13330	-3.06794
-10% discount x Grave within the room	0.36395	0.22117	1.64559
-10% discount x No grave	-0.49927	0.11319	-4.41107
-15% discount x Grave at the frontage of the building	-0.45181	0.14742	-3.06475
-15% discount x Grave besides the building	0.13882	0.13238	1.04868
-15% discount x Grave at the backyard	0.08670	0.12352	0.70193

-15% discount x Grave within the room	0.13841	0.21563	0.64191
-15% discount x No grave	0.08787	0.11261	0.78029
-20% discount x Grave at the frontage of the building	0.02205	0.12530	0.17594
-20% discount x Grave besides the building	0.03152	0.12699	0.24824
-20% discount x Grave at the backyard	0.07543	0.11417	0.66070
-20% discount x Grave within the room	0.24544	0.20504	1.19706
-20% discount x No grave	-0.37444	0.10869	-3.44501
10% rent increase x Grave at the frontage of the building	-0.26387	0.18821	-1.40202
10% rent increase x Grave besides the building	-0.17459	0.19637	-0.88907
10% rent increase x Grave at the backyard	0.00310	0.16967	0.01825
10% rent increase x Grave within the room	-0.01933	0.32565	-0.05935
10% rent increase x No grave	0.45469	0.13188	3.44769
NONE	0.99248	0.05529	17.95031
Number of Respondents	300		

Appendix II

HB Model Average Utility Estimates

Average Utilities (Zero-Centered Diffs)	Average Utilities	Standard Deviation
-5% discount	-19.53138	43.63507
-10% discount	1.23695	27.85902
-15% discount	16.90034	36.06128
-20% discount	26.08502	44.93375
10% rent increase	-24.69094	40.45196
24 hours electricity and water supply.	12.39172	22.06794
8 hours of electricity and water supply per day	-13.40455	16.52796
24 hours of electricity and 8 hours of water supply per day	7.87133	19.83123
8 hours electricity and 24 hours of water supply per day.	-6.85850	21.23297
Grave at the frontage of the building	-41.22001	56.70107
Grave besides the building	-27.50115	44.99824
Grave at the backyard	15.46907	31.48010
Grave within the room	-109.88578	28.76979
No grave	163.13786	117.19936
Large compound no fence	-16.43601	15.92581
Large compound with fence	18.87637	17.93388
Small compound with fence	-6.70668	23.67815
Small compound no fence	4.26632	24.51435
15 minutes by bus to work and local services	3.66449	11.48952
30 minutes bus to work and local services.	-4.40036	18.47076

15 minutes to work and 30 minutes to local services by bus.	-0.06197	15.26197
15 minutes to local services and 30 minutes to work by bus	0.79784	11.23557
Double bed size room(s) (100 sq ft),cross ventilation	36.21741	15.78833
Double bed size room(s) (100 sq ft,)no cross ventilation	-5.14573	23.22314
Single bedroom(s) (70 sq ft),cross ventilation	7.31917	22.56488
Single bed size room(s) (70 sq ft),no ventilation	-38.39085	25.39851
-5% discount x Grave at the frontage of the building	-12.98594	19.22657
-5% discount x Grave besides the building	10.16846	12.06653
-5% discount x Grave at the backyard	-8.98034	32.46834
-5% discount x Grave within the room	-1.57226	13.41731
-5% discount x No grave	13.37007	15.18810
-10% discount x Grave at the frontage of the building	0.32682	27.45989
-10% discount x Grave besides the building	11.79800	10.90545
-10% discount x Grave at the backyard	0.86656	48.20001
-10% discount x Grave within the room	5.04971	32.57263
-10% discount x No grave	-18.04108	31.06306
-15% discount x Grave at the frontage of the building	-0.92691	10.51881
-15% discount x Grave besides the building	-20.21207	23.18776
-15% discount x Grave at the backyard	14.97950	23.67961
-15% discount x Grave within the room	-4.55340	18.01913

-15% discount x No grave	10.71288	35.73842
-20% discount x Grave at the frontage of the building	3.11260	11.19187
-20% discount x Grave besides the building	3.08341	17.33363
-20% discount x Grave at the backyard	2.18552	36.50850
-20% discount x Grave within the room	-8.45706	16.94020
-20% discount x No grave	0.07552	26.86654
10% rent increase x Grave at the frontage of the building	10.47342	22.66940
10% rent increase x Grave besides the building	-4.83780	16.41573
10% rent increase x Grave at the backyard	-9.05123	13.80708
10% rent increase x Grave within the room	9.53301	15.68448
10% rent increase x No grave	-6.11739	21.18642
None	89.26321	105.71227

Appendix III.

Fixed Choice with One Interaction

Average Utilities (Zero-Centered Diffs)	Average Utilities
-5% discount	16.94898
-10% discount	-8.59181
-15% discount	-7.82827
-20% discount	-57.67895
10% rent increase	57.15005
24 hours electricity and water supply.	-39.44570
8 hours of electricity and water supply per day	12.50903
24 hours of electricity and 8 hours of water supply per day	8.14383
8 hours electricity and 24 hours of water supply per day.	18.79284
Grave at the frontage of the building	-20.27770
Grave besides the building	-22.27623
Grave at the backyard	3.35011
Grave within the room	-0.21940
No grave	39.42322
Large compound no fence	-21.97226
Large compound with fence	-9.81434
Small compound with fence	9.28907
Small compound no fence	22.49753
15 minutes by bus to work and local services	-18.15526
30 minutes bus to work and local services.	18.58318
15 minutes to work and 30 minutes to local services by bus.	9.47220

15 minutes to local services and 30 minutes to work by bus	-9.90012
Double bed size room(s)(100 sq ft),cross ventilation	34.16018
Double bed size room(s)(100 sq ft,)no cross ventilation	-1.69097
Single bedroom(s)(70 sq ft),cross ventilation	3.81072
Single bed size room(s) (70 sq ft),no ventilation	-36.27993
-5% discount x Grave at the frontage of the building	-61.03917
-5% discount x Grave besides the building	64.04124
-5% discount x Grave at the backyard	-28.60441
-5% discount x Grave within the room	20.36068
-5% discount x No grave	5.24166
-10% discount x Grave at the frontage of the building	14.45629
-10% discount x Grave besides the building	-17.09789
-10% discount x Grave at the backyard	-51.43267
-10% discount x Grave within the room	43.42647
-10% discount x No grave	10.64781
-15% discount x Grave at the frontage of the building	42.16037
-15% discount x Grave besides the building	-29.89677
-15% discount x Grave at the backyard	8.01514
-15% discount x Grave within the room	-4.37034
-15% discount x No grave	-15.90840
-20% discount x Grave at the frontage of the building	-20.35471
-20% discount x Grave besides the building	26.61095
-20% discount x Grave at the backyard	51.55744
-20% discount x Grave within the room	-30.71322

-20% discount x No grave	-27.10045
10% rent increase x Grave at the frontage of the building	24.77722
10% rent increase x Grave besides the building	-43.65753
10% rent increase x Grave at the backyard	20.46450
10% rent increase x Grave within the room	-28.70358
10% rent increase x No grave	27.11938
None	30.49793

Variables	**Average Importance**
Rent	21.95308
Building services	17.77115
Grave	21.99410
Compound size and fencing	11.75856
Accessibility	12.67829
Rooms Size and ventilation	13.84482

Appendix (iv)

Line fit plot for on residential property with a grave at the side

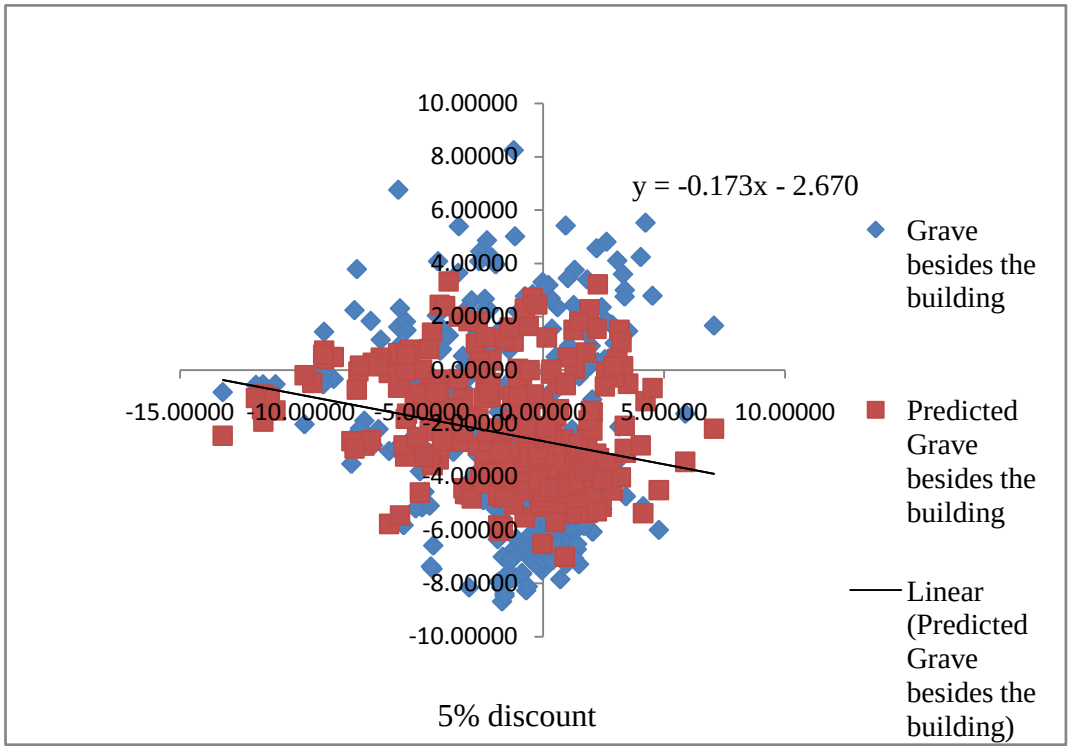

Figure 10.1: Line fit plot for 5 percent rent discount on residential property with a grave at the side

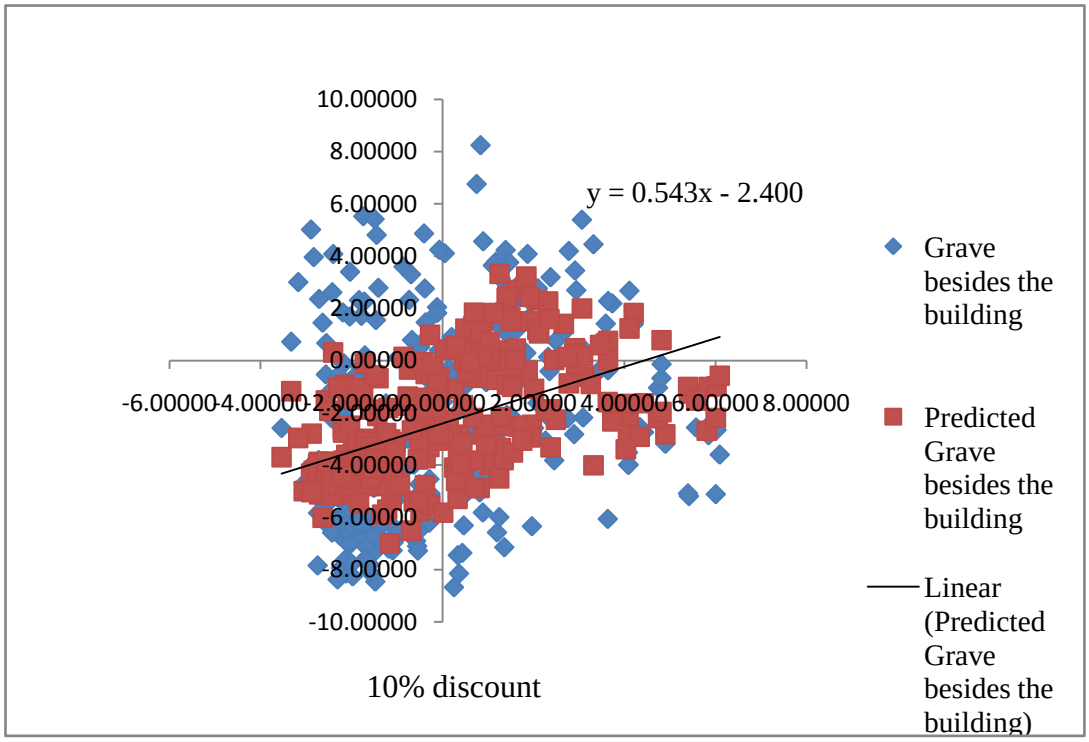

Figure 10.2: Line fit plot for 10 percent rent discount on residential property with a grave at the side

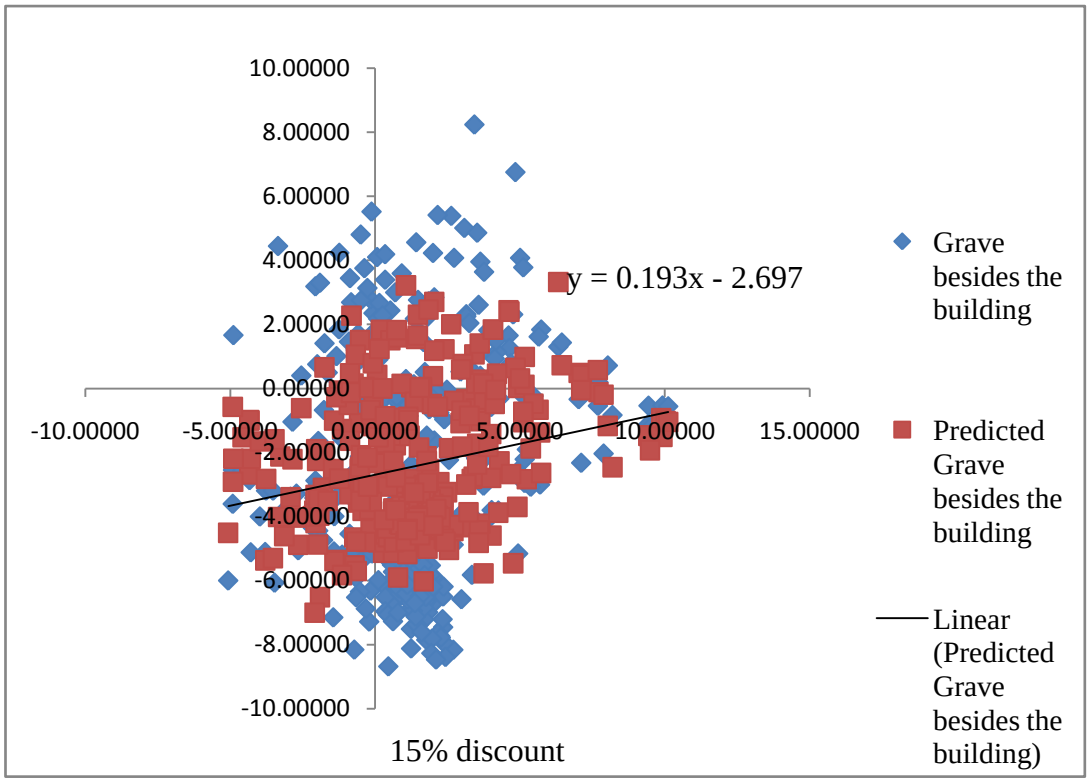

Figure 10.3: Line fit plot for 15 percent rent discount on residential property with a grave at the side

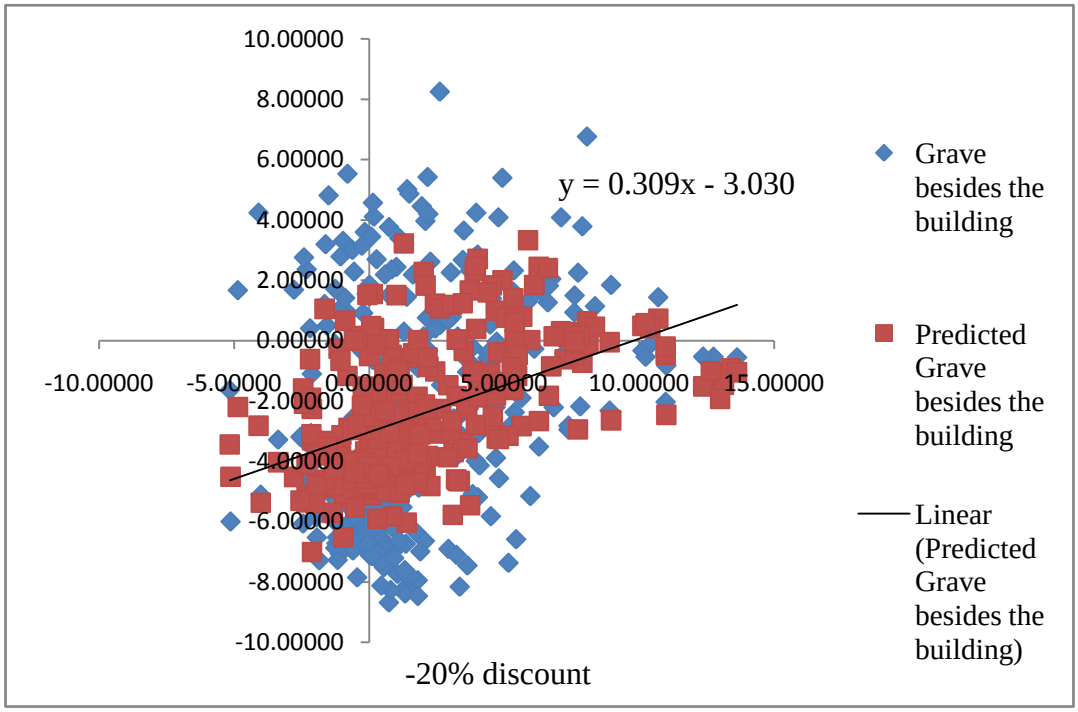

Figure 10.4: Line fit plot for 20 percent rent discount on residential property with a grave at the side

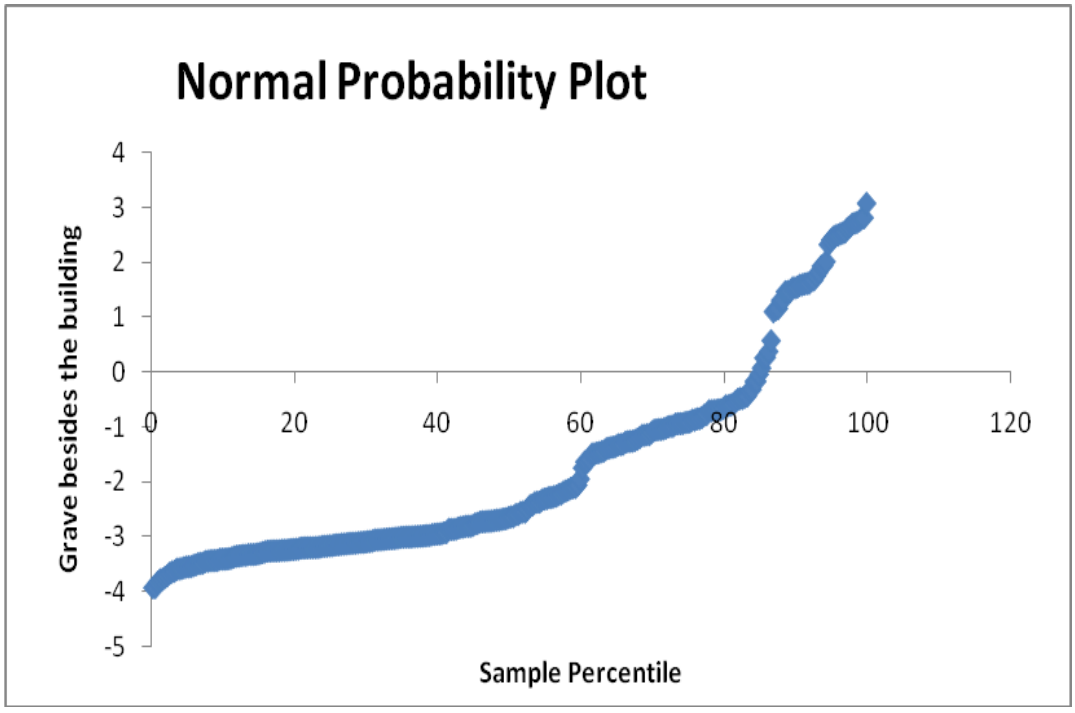

Figure 10.5: Normal Probability Plot for a Residential Property with a Grave at the Side

Appendix (V)

Line Fit Plot for Residential Property with a Grave at the Backyard

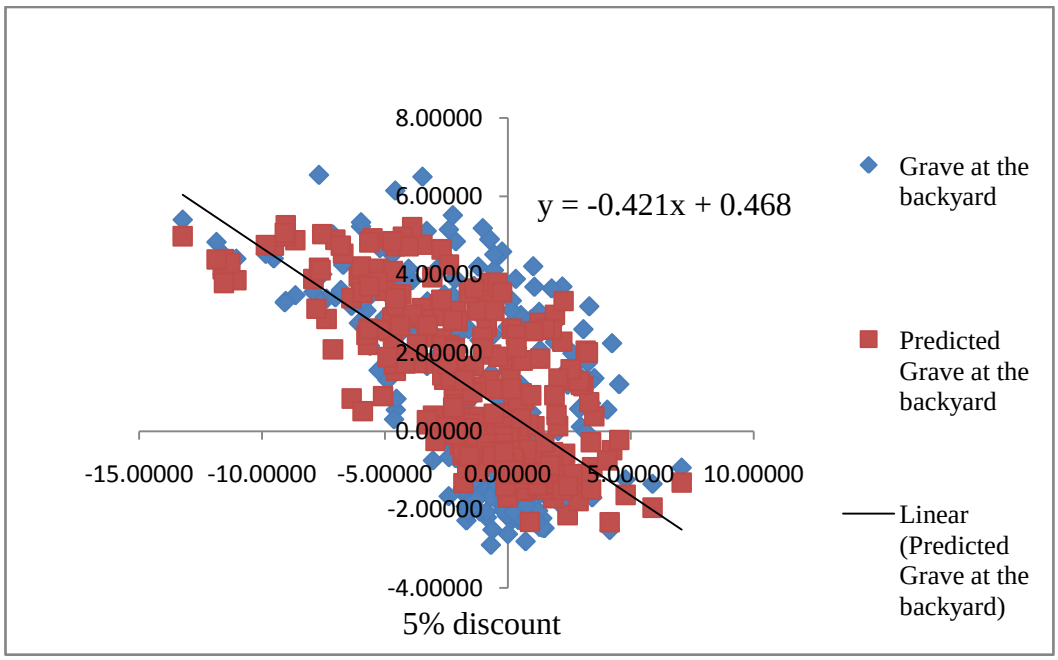

Figure 10.6: Line fit plot for 5 percent discount for property with a grave at the backyard

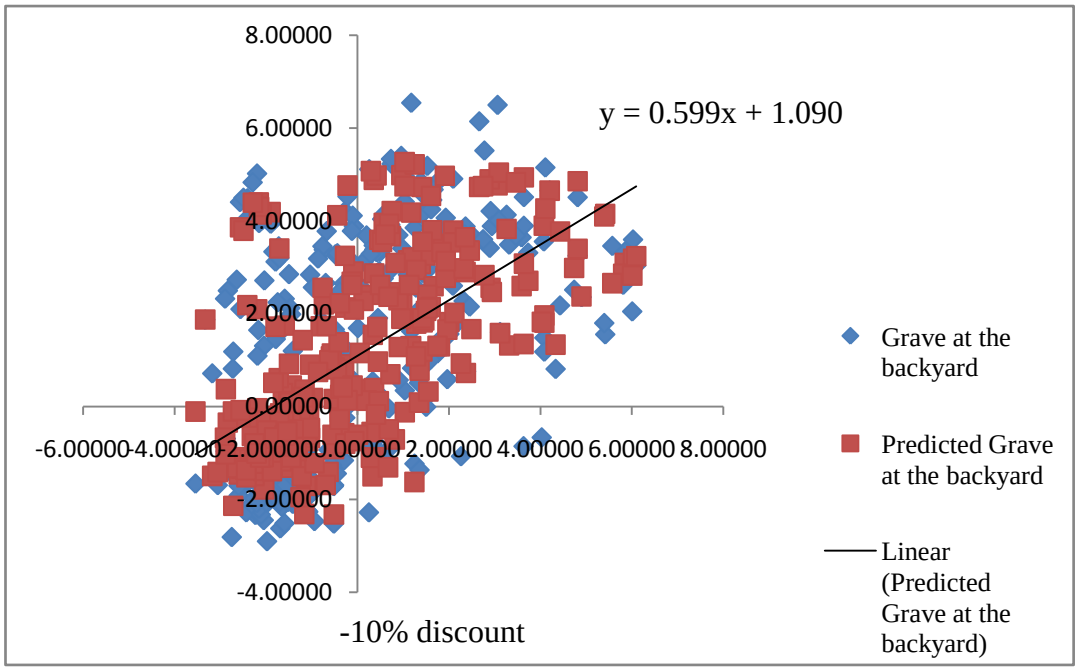

Figure 10.7: Line fit plot for 10 percent rent discount on property with a grave at the backyard

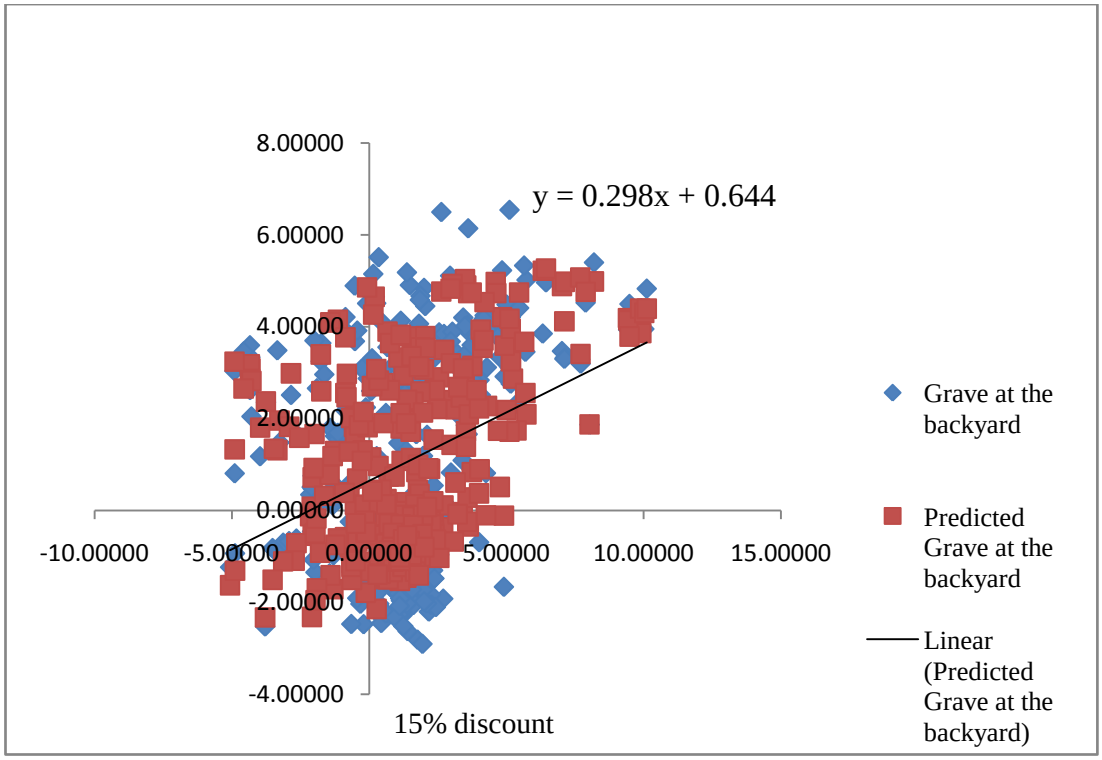

Figure 10.8: Line fit plot for 15 percent rent discount on property with a grave at the backyard

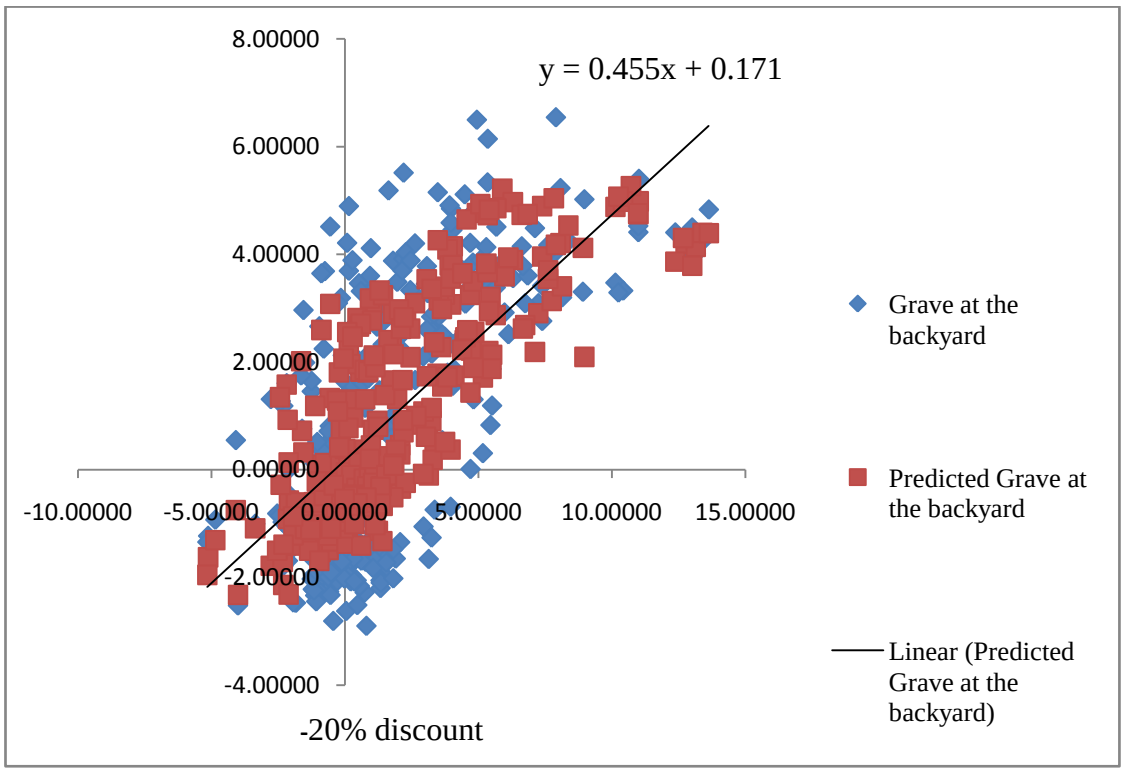

Figure 10.9: Line fit plot for 20 percent rent discount on property with a grave at the backyard

Appendix (VI)

Line Fit Plot for Residential Property with a Grave in a Room

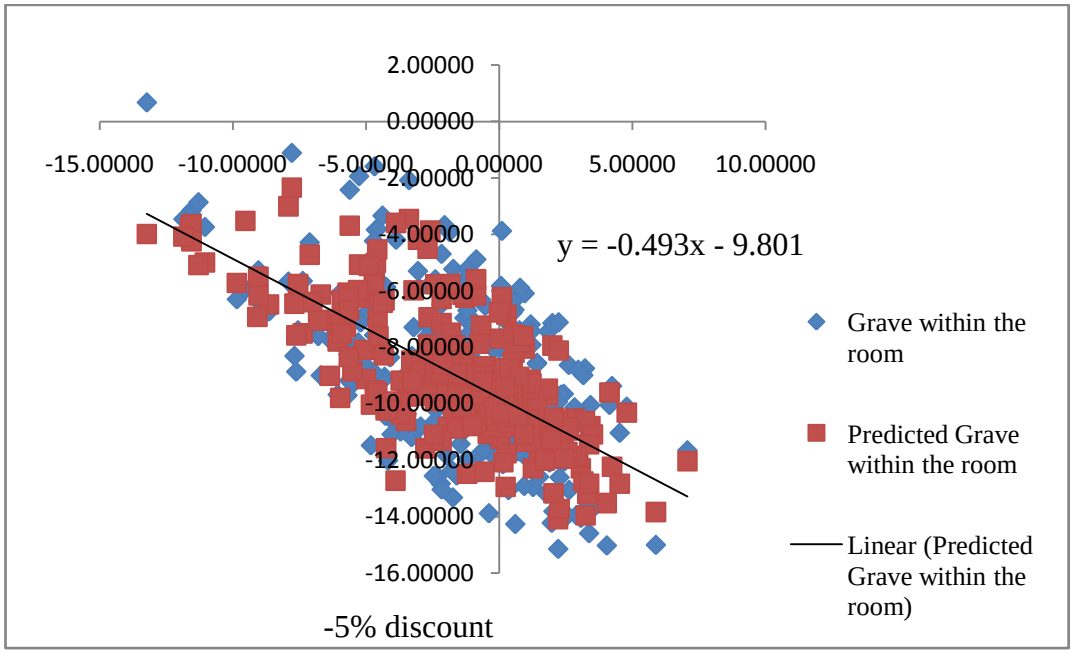

Figure 10.10: Line fit plot for 5 percent rent discount on property with a grave in the room

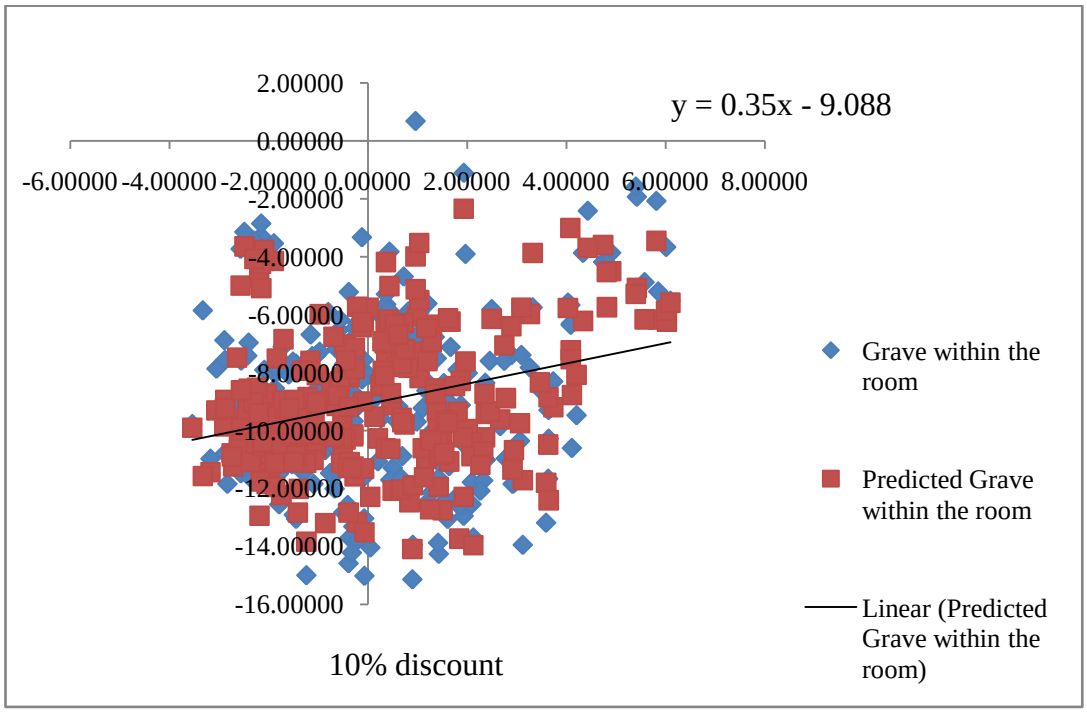

Figure 10.11:Line fit plot for 10 percent rent discount on property with a grave in the room

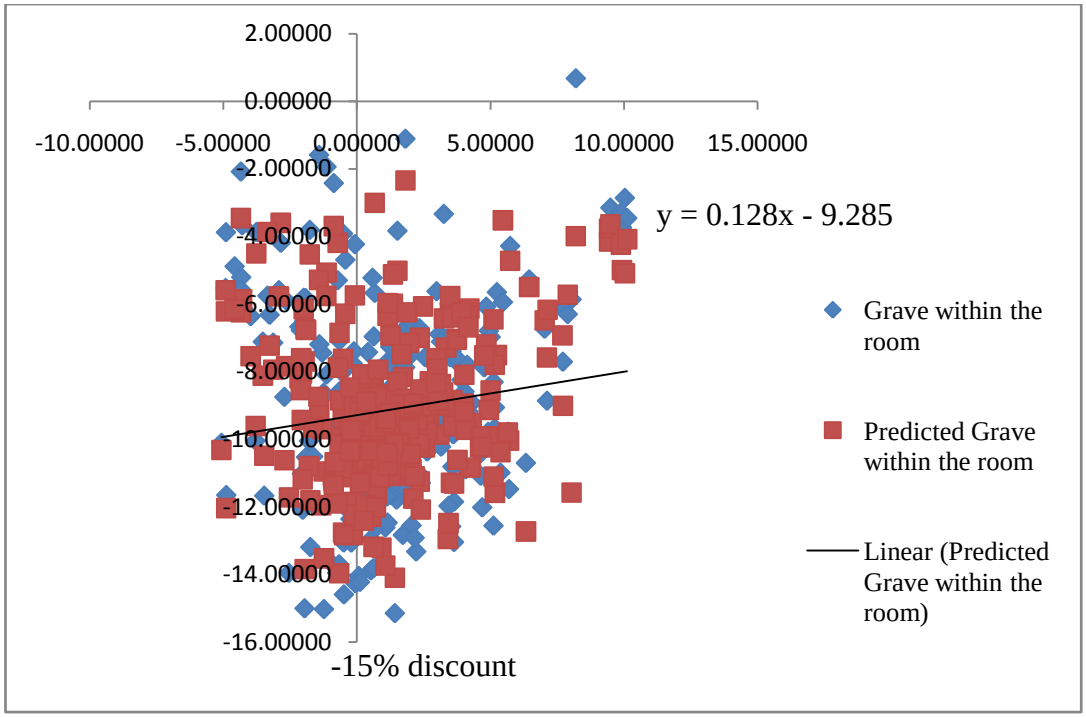

Figure 10.12:Line fit plot for 15 percent rent discount on property with a grave in the room

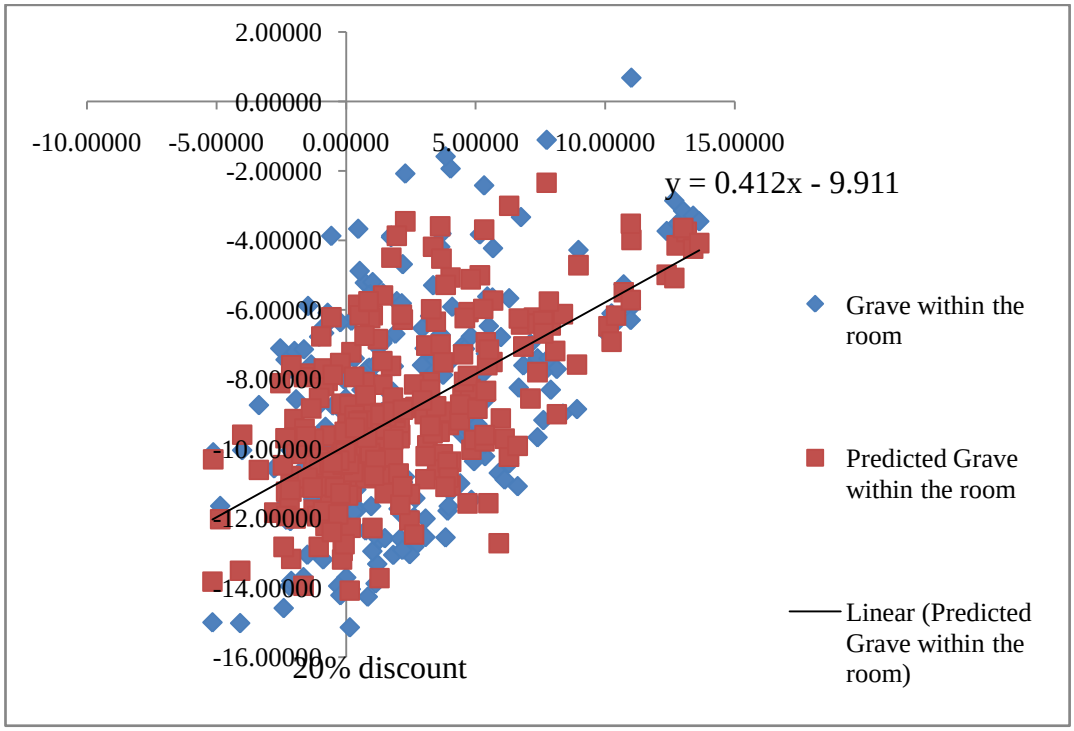

Figure 10.13:Line fit plot for 20 percent rent discount on property with a grave in the room

Appendix VII.

Residual Utility Output for a Property with a Grave at the Frontage.

Observation	Predicted Utility	Observed Utility	Residuals
1	-8.143973366	-5.99600	2.147973366
2	-9.876445801	-8.90689	0.969555801
3	-5.124423744	-5.11568	0.008743744
4	-7.526031117	-9.65898	-2.13294888
5	-1.943483456	1.45494	3.398423456
6	-7.679287348	-7.67292	0.006367348
7	-4.992602364	-7.52579	-2.53318764
8	-8.889114227	-10.32827	-1.43915577
9	-4.271737037	-3.32849	0.943247037
10	-2.004054615	-3.27606	-1.27200539
11	-1.049298731	-3.09832	-2.04902127
12	-5.176220585	-4.69714	0.479080585
13	-4.092128965	-5.08853	-0.99640103
14	-4.702483574	-4.75109	-0.04860643
15	-2.516375333	-4.17623	-1.65985467
16	-8.527365346	-10.11114	-1.58377465
17	-7.584200141	-9.52028	-1.93607986
18	-7.286319671	-8.58179	-1.29547033
19	-3.334793962	-1.64758	1.687213962
20	-6.757455596	-8.46317	-1.7057144
21	-6.788057261	-1.23295	5.555107261
22	-10.09996051	-7.50534	2.594620515
23	-4.256711813	-1.75917	2.497541813

24	2.350540512	0.18442	-2.16612051
25	-5.62630925	-1.34523	4.28107925
26	-8.676293996	-10.37083	-1.694536
27	-7.08937594	-9.60970	-2.52032406
28	-4.253979952	-5.84915	-1.59517005
29	-2.924228676	-5.12099	-2.19676132
30	-8.806232517	-6.53668	2.269552517
31	-0.901892946	2.45258	3.354472946
32	-1.604750875	-5.14105	-3.53629912
33	-9.397499838	-5.08219	4.315309838
34	-9.541794958	-5.14991	4.391884958
35	-7.527336198	-9.88908	-2.3617438
36	-2.956911388	-3.34572	-0.38880861
37	-3.17020608	-3.42983	-0.25962392
38	-3.337396198	-6.05808	-2.7206838
39	-4.582588784	-6.51111	-1.92852122
40	-3.222717274	-5.86247	-2.63975273
41	-1.405520154	-2.21393	-0.80840985
42	-1.141654339	-4.29853	-3.15687566
43	-7.696838575	-10.23303	-2.53619143
44	-9.574976841	-10.60618	-1.03120316
45	-8.339723114	-9.70298	-1.36325689
46	-0.505756627	-2.26929	-1.76353337
47	-8.096123262	-5.56762	2.528503262
48	-8.637813831	-9.41870	-0.78088617
49	-5.200672219	-5.57090	-0.37022778

50	-4.393174865	-3.33006	1.063114865
51	-3.750827234	-5.55429	-1.80346277
52	-7.872977704	-5.34325	2.529727704
53	-7.218411636	-5.36041	1.858001636
54	-1.68759143	0.61707	2.30466143
55	0.144234648	-0.70900	-0.85323465
56	-9.47270707	-9.64387	-0.17116293
57	-7.785148082	-9.67253	-1.88738192
58	-3.965026128	-3.33153	0.633496128
59	0.411543942	0.23356	-0.17798394
60	-9.620001489	-6.07150	3.548501489
61	0.904339402	-0.10332	-1.0076594
62	-4.759273725	-4.92405	-0.16477627
63	-8.953689127	-10.68917	-1.73548087
64	-9.696247147	-10.11657	-0.42032285
65	4.198358348	6.91167	2.713311652
66	-6.353216181	-3.90029	2.452926181
67	-9.601516198	-10.02114	-0.4196238
68	-8.732536125	-9.58734	-0.85480387
69	-2.746743377	-0.39617	2.350573377
70	-8.718886418	-10.14847	-1.42958358
71	-9.363633768	-9.76675	-0.40311623
72	-4.994784125	-8.23439	-3.23960587
73	-5.070897168	-3.81092	1.259977168
74	0.301465589	1.36899	1.067524411
75	2.409675862	5.04335	2.633674138

76	0.595318503	0.91913	0.323811497
77	-1.607366644	-4.43469	-2.82732336
78	-2.857199403	-6.37941	-3.5222106
79	-4.529585775	-7.12511	-2.59552423
80	-1.194363239	0.59256	1.786923239
81	-6.224063684	-3.84563	2.378433684
82	-2.71699913	-4.76022	-2.04322087
83	-8.362418496	-8.56285	-0.2004315
84	-4.635467698	-1.37946	3.256007698
85	-4.762864964	-3.19424	1.568624964
86	-3.210637807	-1.90782	1.302817807
87	0.611376059	4.05477	3.443393941
88	-8.939927659	-9.65877	-0.71884234
89	-3.233763964	-6.19194	-2.95817604
90	-0.255505699	-6.62509	-6.3695843
91	6.304389898	5.40740	-0.8969899
92	6.475014762	5.14913	-1.32588476
93	5.162905847	6.05865	0.895744153
94	2.60851799	2.89995	0.29143201
95	2.554407374	2.72234	0.167932626
96	5.086847307	3.55075	-1.53609731
97	3.585426244	4.02930	0.443873756
98	4.270977138	3.77593	-0.49504714
99	4.018632118	4.42568	0.407047882
100	5.113371957	5.14606	0.032688043
101	5.416058882	4.62226	-0.79379888

102	4.125835497	3.93291	-0.1929255
103	5.456032224	5.67144	0.215407776
104	3.20592212	2.95146	-0.25446212
105	7.428092388	5.38190	-2.04619239
106	-6.172153889	-8.58858	-2.41642611
107	-7.851648515	-9.04523	-1.19358148
108	-1.77372813	-3.06334	-1.28961187
109	-4.271696524	-1.64817	2.623526524
110	-7.243120349	-8.21098	-0.96785965
111	-0.007826775	-1.19904	-1.19121323
112	-6.747740519	-7.63851	-0.89076948
113	-0.768240847	-4.85102	-4.08277915
114	1.428982829	1.43681	0.007827171
115	-1.274908322	0.85075	2.125658322
116	-0.195039656	-3.81171	-3.61667034
117	-6.036577226	-6.90428	-0.86770277
118	-7.561657587	-7.65536	-0.09370241
119	0.707273419	3.03643	2.329156581
120	6.326142934	4.73446	-1.59168293
121	-0.302728356	-1.74477	-1.44204164
122	-5.748317452	-7.11086	-1.36254255
123	2.131007736	-0.12150	-2.25250774
124	-2.1554142	1.29073	3.4461442
125	-0.026225988	-0.03270	-0.00647401
126	3.704263155	1.63038	-2.07388316
127	-7.320011889	-9.75502	-2.43500811

128	-3.369492599	-0.43986	2.929632599
129	3.36621141	2.32940	-1.03681141
130	-7.945188727	-9.06123	-1.11604127
131	2.867139457	0.80990	-2.05723946
132	-7.461220452	-9.07400	-1.61277955
133	2.999462643	2.14656	-0.85290264
134	-8.028367746	-9.29077	-1.26240225
135	-8.164211196	-9.53428	-1.3700688
136	-4.679365051	-3.45400	1.225365051
137	-7.176613289	-9.52069	-2.34407671
138	-6.860543551	-8.92799	-2.06744645
139	-5.804891559	-3.70276	2.102131559
140	-4.715345055	-2.59222	2.123125055
141	-5.640633763	-3.73677	1.903863763
142	-4.389529242	-3.26886	1.120669242
143	-4.840907646	-3.64716	1.193747646
144	-5.882516246	-8.64058	-2.75806375
145	-4.069967363	-3.67784	0.392127363
146	-6.880674195	-9.58331	-2.70263581
147	-4.683279978	-3.89571	0.787569978
148	-6.119216537	-9.04650	-2.92728346
149	-7.113401014	-8.37927	-1.26586899
150	-6.306043761	-9.29186	-2.98581624
151	-7.762036807	-8.01781	-0.25577319
152	-9.153034708	-9.75168	-0.59864529
153	-2.611615061	-3.14073	-0.52911494

154	-9.750565105	-10.69281	-0.9422449
155	1.990071274	1.18400	-0.80607127
156	-4.062286836	-6.56588	-2.50359316
157	-2.674040308	-0.43355	2.240490308
158	0.060954143	8.61132	8.550365857
159	-8.555077212	-9.16384	-0.60876279
160	-6.762405475	-5.55189	1.210515475
161	-8.509289947	-10.24285	-1.73356005
162	1.835433622	8.82885	6.993416378
163	-0.318836525	2.66815	2.986986525
164	4.376145946	5.22000	0.843854054
165	3.504149913	2.99865	-0.50549991
166	-7.163981753	-9.87577	-2.71178825
167	-5.607138429	-5.28344	0.323698429
168	-6.94803224	-9.31453	-2.36649776
169	-7.072250821	-9.04786	-1.97560918
170	-7.53796192	-8.61055	-1.07258808
171	-0.979088227	-0.46850	0.510588227
172	-4.472643139	-3.26171	1.210933139
173	-4.524859167	-2.60831	1.916549167
174	-3.797709838	-2.83217	0.965539838
175	-5.343486218	0.20573	5.549216218
176	-5.56617934	-2.30912	3.25705934
177	-8.051516962	-5.37879	2.672726962
178	-8.266078797	-5.15633	3.109748797
179	-3.459011896	-2.48973	0.969281896

180	-6.467492404	-2.81009	3.657402404
181	-3.763988307	-4.27080	-0.50681169
182	-8.494952917	-9.32189	-0.82693708
183	2.035720003	1.39588	-0.63984
184	-8.875816913	-8.44038	0.435436913
185	-7.200457792	-2.47049	4.729967792
186	-8.005283038	-9.20157	-1.19628696
187	2.934652501	2.40530	-0.5293525
188	-8.914250716	-9.86829	-0.95403928
189	1.337119025	0.48787	-0.84924903
190	2.501579652	1.21168	-1.28989965
191	0.663970983	-0.53250	-1.19647098
192	3.465054694	5.41721	1.952155306
193	-8.58536955	-9.14701	-0.56164045
194	-8.995582462	-9.56400	-0.56841754
195	1.474402895	0.97419	-0.50021289
196	-7.683934595	-3.30085	4.383084595
197	0.635502732	3.91865	3.283147268
198	-6.608881298	-5.12646	1.482421298
199	1.364013119	4.61855	3.254536881
200	-9.447197343	-5.07356	4.373637343
201	-10.15516548	-6.94855	3.206615477
202	-7.703179985	-9.83942	-2.13624001
203	-8.983561887	-6.84071	2.142851887
204	-7.973881867	-3.22833	4.745551867
205	0.895866557	1.38925	0.493383443

206	1.599703459	0.10518	-1.49452346
207	6.545451441	7.27990	0.734448559
208	-3.399856378	-5.53952	-2.13966362
209	-4.265219178	-4.37358	-0.10836082
210	-5.990899825	-2.87062	3.120279825
211	-0.274605422	-0.74410	-0.46949458
212	-6.496184135	-6.28131	0.214874135
213	1.182382339	2.05265	0.870267661
214	-6.646566835	-6.87723	-0.23066316
215	-7.324252304	-7.19665	0.127602304
216	-8.222767618	-5.63488	2.587887618
217	-5.846062799	-6.19229	-0.3462272
218	-0.222590757	-1.11566	-0.89306924
219	-8.671411255	-9.30151	-0.63009874
220	-6.534283078	-5.92482	0.609463078
221	-6.664999816	-6.34581	0.319189816
222	-0.56439411	-0.93385	-0.36945589
223	-1.378540539	-0.07216	1.306380539
224	-7.706798653	-8.33885	-0.63205135
225	-0.131336193	-0.11678	0.014556193
226	-9.977969065	-9.29570	0.682269065
227	-1.587372035	-6.21282	-4.62544796
228	-5.248168815	-4.12469	1.123478815
229	-6.943735239	-9.74755	-2.80381476
230	-6.936439357	-7.84158	-0.90514064
231	-5.635360435	-5.54764	0.087720435

232	-10.03042214	-8.15659	1.873832144
233	-3.528377797	-0.89817	2.630207797
234	-7.998176177	-10.29761	-2.29943382
235	-5.403190871	-6.10945	-0.70625913
236	3.868151788	1.16999	-2.69816179
237	-6.549533506	-1.32768	5.221853506
238	-9.50792183	-4.65735	4.85057183
239	-2.133854295	-0.49212	1.641734295
240	-2.915862154	-3.85558	-0.93971785
241	-0.470881157	1.36520	1.836081157
242	5.263840598	5.72243	0.458589402
243	-4.100324567	-2.89335	1.206974567
244	1.773438902	0.90528	-0.8681589
245	-2.097704034	1.27772	3.375424034
246	-0.051180898	1.07967	1.130850898
247	1.936094283	0.82674	-1.10935428
248	1.681172447	3.83223	2.151057553
249	-6.856360077	-9.40879	-2.55242992
250	-8.108474558	-9.07538	-0.96690544
251	-7.565457235	-9.66508	-2.09962276
252	0.360545914	-0.88661	-1.24715591
253	2.518348923	4.19921	1.680861077
254	2.025900732	4.81000	2.784099268
255	-0.648840017	-0.87049	-0.22164998
256	-8.33198335	-9.27158	-0.93959665
257	-8.687186657	-11.22511	-2.53792334

258	-8.00659267	-10.84746	-2.84086733
259	-4.942241477	-6.49955	-1.55730852
260	-7.914486239	-10.09710	-2.18261376
261	-7.130535687	-9.63367	-2.50313431
262	-2.128175388	-1.15556	0.972615388
263	-8.279236739	-9.13953	-0.86029326
264	1.662503333	2.36819	0.705686667
265	-7.578417951	-8.80404	-1.22562205
266	-7.246655565	-9.81656	-2.56990443
267	-9.055564403	-11.04192	-1.9863556
268	-8.095721328	-10.15258	-2.05685867
269	-6.887499484	-10.18197	-3.29447052
270	-7.792855626	-10.39439	-2.60153437
271	2.563584581	0.92146	-1.64212458
272	-8.61624153	-9.58511	-0.96886847
273	1.292931077	1.26362	-0.02931108
274	-7.907196466	-9.19288	-1.28568353
275	-8.799412303	-10.02262	-1.2232077
276	-8.785605236	-10.51852	-1.73291476
277	-5.115957715	2.52296	7.638917715
278	-4.475272517	-4.17359	0.301682517
279	-7.644926032	-9.43926	-1.79433397
280	1.092451984	1.90321	0.810758016
281	-2.107923523	0.75043	2.858353523
282	-0.965006461	3.54446	4.509466461
283	-1.627056724	-2.75228	-1.12522328

284	-8.54071219	-10.27655	-1.73583781
285	-8.297246251	-10.38388	-2.08663375
286	-5.894875778	-2.18004	3.714835778
287	-8.219768173	-6.49057	1.729198173
288	2.864940828	2.30982	-0.55512083
289	3.15613291	1.70571	-1.45042291
290	-0.668831657	-1.77316	-1.10432834
291	-3.316704709	-1.28769	2.029014709
292	2.270757072	2.01825	-0.25250707
293	-0.474827409	1.78009	2.254917409
294	-2.686784086	-1.91371	0.773074086
295	1.95912899	3.63937	1.68024101
296	-2.325805004	-5.16500	-2.839195
297	3.435955458	1.42522	-2.01073546
298	-3.730751574	-3.81135	-0.08059843
299	-0.002562699	2.13453	2.137092699
300	3.26490348	1.13397	-2.13093348

Appendix VIII

Dear Sir/Madam,

Invitation to Participate in a Tenants' Survey.

This survey is carried out to collect information on tenants' choices and preferences for residential housing under negative externality. Specifically, the study seeks to determine tenants' preferences and willingness to pay for residential properties with grave in Akure. This is part of an ongoing PhD research work at the Institute for Housing, Urban and Real Estate Research, Heriot-Watt University Edinburgh, United Kingdom.

Participation in this exercise does not require your personal details such as name, phone number and home address. I wish to reassure you that the questions will not infringe on your privacy. Responses will be used for academic purposes only; your true personal opinions to the questions would be appreciated.

Yours faithfully,

Solomon, Pelumi AKINBOGUN,

PhD Research Student,
Institute for Housing, Urban and Real Estate Research,
School of Built Environment,
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EH14 4AS

SECTION A

Welcome to the survey, this section asks questions on your perception of residential land use in your district as well as other important information on your rented apartment.

1. How would you describe the situation of residential land use in your street/residential district?
   (a) Highly compatible
   (b) Compatible
   (c) Fairly compatible
   (d) Incompatible
   (e) I don't know

2. Government control over landlord's use of residential property rights in your area is commendable?
   (a) Strongly agree
   (b) Agree
   (c) Neither agree nor disagree
   (d) Disagree
   (e) Strongly disagree

3. Landlords use their property rights to ensure that tenants' have optimum enjoyment of rented apartment.
   (a). Strongly agree,
   (b). Agree
   (c). Neither agree nor disagree
   (d). Disagree
   (e). Strongly disagree

4. Development control on residential developments is more effective in Government Reserved Areas (G.R.A) than private residential areas.
   (a). Strongly agree,
   (b). Agree,
   (c). Neither agree nor disagree,

(d). Disagree,

(e). Strongly disagree.

5. Which of the following listed types of residential properties best describe your current type of rented apartment?
   (a). Rooming apartment (a.k.a Face to face)
   (b). Block of flat
   (c). Self contain
   (d). Bungalow
   (d). Duplex

6. How did you rent your present accommodation?
   (a) Through an Estate Surveyor and Valuer,
   (b) Directly from the Landlord,
   (c). Through a Caretaker.

7. Do you consider your present residential location as the best for your daily activities?
   (a).Yes
   (b). No

8. What type of tenancy arrangement are you operating?
   (a). Monthly tenancy
   (b). Quarterly tenancy (3 months)
   (c). Half yearly (6 month)
   (d). Yearly (1 year)

9. How long have you lived in your present house?
   (a) 1-5.years,
   (b) 6-10 years
   (c) 11-15 years
   (d) 16-20 years.

10. As a tenant, do you have any right to prevent development of incompatible use of land that could affect your social welfare and satisfaction during your

tenancy period?

(a).Yes,

(b). No,

Section B

This section seeks to gather information on tenants' level of tolerant to location of grave within residential building.

11. Do you have any reason for moving home within the next year?
    (a).Yes,
    (b). No.

12. Which of these developments do you strongly believe should not be located within your current residence? (Choose one)
    (a). Shopping complex,
    (b). Bakery,
    (c).Grave.
    (d). None

13. How would you react if your landlord decides to locate grave within the house?
    (a). I will move home as soon as my tenancy period expires,
    (b). I will move home before my tenancy period expires,
    (c). I will continue my tenancy for as long as I wish to stay,

14. Which of the followings would you do to resist location of grave within your current rented house?
    (a). I will advise my landlord not to locate grave within his property,
    (b). I will inform the Development Control Authority to stop it,
    (c). I cannot do anything to prevent it from happening.

15 What is your candid opinion on burial of human remains on residential housing?
    (a). I support burial of human remains on residential housing,
    (b). I do not support burial of human remains on residential housing
    (c). I am indifferent to it,

(d). People should be allowed to bury their dead loved ones where ever they prefer.

16 In which of the following ways would you be affected by the sight of a grave in a home?

(a). It would have psychological effect on me.

(b). It would affect my thought,

(c). It would affect the level of aesthetic I desire,

(d). I cannot explain the horrible effect,

(e). No effect.

17 Which of these developments do you have in your current home?

(a). Shop,

(b).Grave,

(c). None

18. Which of these can be found on your street?

(a). Residential property with a grave at the frontage.

(b). Houses with a grave at the sides.

(c). Houses with a grave at the backyard.

(d). All of the above.

(e). None of the above.

PLEASE TURN OVER

Section C.

This section seeks your preference and willingness to rent residential property with grave. Four housing options with different attributes are provided in each choice task. The options provided are common sights in your residential environment. To answer the questions, we would like you to imagine that your tenancy period has just expired and the landlord wants to take over his property. Please read through the options carefully and choose one of the four housing options you will choose in reality.

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Single bedroom(s)(70 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes to work and 30 minutes to local services by bus.	30 minutes bus to work and local services.	15 minutes to local services and 30 minutes to work by bus	
Building services	24 hours electricity and water supply.	8 hours electricity and 24 hours of water supply per day.	24 hours of electricity and 8 hours of water supply per day	
Grave	No grave	Grave within the room	Grave at the backyard	
Compound size and fencing	Small compound with fence	Small compound no fence	Large compound with fence	
Rent	-5% discount	-20% discount	-15% discount	
	○	○	○	○

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Single bed size room(s) (70 sq ft),no ventilation	Single bedroom(s)(70 sq ft),cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes to local services and 30 minutes to work by bus	30 minutes bus to work and local services.	15 minutes by bus to work and local services	
Building services	8 hours of electricity and water supply per day	24 hours electricity and water supply.	8 hours of electricity and water supply per day	
Grave	Grave at the frontage of the building	Grave within the room	Grave besides the building	
Compound size and fencing	Large compound no fence	Large compound no fence	Large compound with fence	
Rent	-20% discount	-10% discount	10% rent increase	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Single bed size room(s) (70 sq ft),no ventilation	Single bedroom(s)(70 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes by bus to work and local services	15 minutes to work and 30 minutes to local services by bus.	15 minutes to local services and 30 minutes to work by bus	
Building services	8 hours electricity and 24 hours of water supply per day.	24 hours of electricity and 8 hours of water supply per day	24 hours electricity and water supply.	
Grave	Grave at the frontage of the building	Grave besides the building	No grave	
Compound size and fencing	Small compound with fence	Small compound no fence	Large compound no fence	
Rent	-10% discount	-5% discount	-15% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Single bed size room(s) (70 sq ft),no ventilation	Double bed size room(s)(100 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes to local services and 30 minutes to work by bus	30 minutes bus to work and local services.	15 minutes to work and 30 minutes to local services by bus.	
Building services	8 hours electricity and 24 hours of water supply per day.	8 hours of electricity and water supply per day	24 hours electricity and water supply.	
Grave	No grave	Grave at the backyard	Grave at the frontage of the building	
Compound size and fencing	Small compound no fence	Small compound with fence	Large compound with fence	
Rent	-5% discount	10% rent increase	-20% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes by bus to work and local services	15 minutes by bus to work and local services	15 minutes by bus to work and local services	
Building services	24 hours electricity and water supply.	24 hours electricity and water supply.	24 hours electricity and water supply.	
Grave	Grave at the frontage of the building	Grave besides the building	Grave at the backyard	
Compound size and fencing	Large compound with fence	Large compound with fence	Large compound with fence	
Rent	-15% discount	-10% discount	-5% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Single bed size room(s) (70 sq ft),no ventilation	Double bed size room(s)(100 sq ft),cross ventilation	NONE: I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	30 minutes bus to work and local services.	15 minutes by bus to work and local services	15 minutes by bus to work and local services	
Building services	24 hours of electricity and 8 hours of water supply per day	8 hours of electricity and water supply per day	24 hours of electricity and 8 hours of water supply per day	
Grave	Grave besides the building	Grave at the backyard	No grave	
Compound size and fencing	Large compound with fence	Small compound with fence	Small compound no fence	
Rent	-10% discount	-15% discount	10% rent increase	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Single bedroom(s)(70 sq ft),cross ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Single bedroom(s)(70 sq ft),cross ventilation	
Accessibility	15 minutes by bus to work and local services	15 minutes to work and 30 minutes to local services by bus.	30 minutes bus to work and local services.	I wouldn't choose any of these, I will keep looking for a suitable house.
Building services	24 hours electricity and water supply.	8 hours electricity and 24 hours of water supply per day.	24 hours of electricity and 8 hours of water supply per day	
Grave	Grave within the room	Grave at the backyard	Grave at the frontage of the building	
Compound size and fencing	Small compound no fence	Large compound no fence	Small compound with fence	
Rent	10% rent increase	-20% discount	-10% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	None
Rooms Size and ventilation	Single bed size room(s) (70 sq ft),no ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Single bed size room(s) (70 sq ft),no ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes by bus to work and local services	15 minutes to local services and 30 minutes to work by bus	15 minutes to work and 30 minutes to local services by bus.	
Building services	8 hours electricity and 24 hours of water supply per day.	8 hours electricity and 24 hours of water supply per day.	8 hours of electricity and water supply per day	
Grave	No grave	Grave besides the building	Grave within the room	
Compound size and fencing	Large compound no fence	Small compound with fence	Large compound with fence	
Rent	10% rent increase	-15% discount	-5% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE 4
Rooms Size and ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	
Accessibility	15 minutes by bus to work and local services	15 minutes by bus to work and local services	15 minutes by bus to work and local services	
Building services	24 hours electricity and water supply.	24 hours electricity and water supply.	24hours electricity and water supply.	I wouldn't choose any of these, I will keep looking for a suitable house.
Grave	Grave within the room	No grave	Grave at the frontage of the building	
Compound size and fencing	Large compound with fence	Large compound with fence	Large compound with fence	
Rent	-20% discount	10% rent increase	-15% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Single bedroom(s)(70 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	30 minutes bus to work and local services.	15 minutes to work and 30 minutes to local services by bus.	15 minutes by bus to work and local services	
Building services	24 hours electricity and water supply.	8 hours of electricity and water supply per day	24 hours of electricity and 8 hours of water supply per day	
Grave	Grave at the frontage of the building	Grave at the backyard	Grave besides the building	
Compound size and fencing	Large compound with fence	Small compound no fence	Large compound no fence	
Rent	-5% discount	-15% discount	-20% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Single bed size room(s) (70 sq ft),no ventilation	Double bed size room(s)(100 sq ft),cross ventilation	NONE: I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	15 minutes to local services and 30 minutes to work by bus	15 minutes to local services and 30 minutes to work by bus	15 minutes to work and 30 minutes to local services by bus.	
Building services	24 hours of electricity and 8 hours of water supply per day	24 hours electricity and water supply.	8 hours of electricity and water supply per day	
Grave	Grave at the frontage of the building	Grave within the room	No grave	
Compound size and fencing	Large compound with fence	Small compound with fence	Large compound no fence	
Rent	10% rent increase	-10% discount	-5% discount	

If these were the housing options available to you when moving to another rented apartment, which would you choose?

Attributes	HOUSE 1	HOUSE 2	HOUSE 3	NONE
Rooms Size and ventilation	Double bed size room(s)(100 sq ft,)no cross ventilation	Double bed size room(s)(100 sq ft),cross ventilation	Single bedroom(s)(70 sq ft),cross ventilation	I wouldn't choose any of these, I will keep looking for a suitable house.
Accessibility	30 minutes bus to work and local services.	15 minutes to local services and 30 minutes to work by bus	15 minutes to work and 30 minutes to local services by bus.	
Building services	8 hours of electricity and water supply per day	24 hours electricity and water supply.	8 hours electricity and 24 hours of water supply per day.	
Grave	Grave within the room	Grave at the backyard	Grave besides the building	
Compound size and fencing	Large compound no fence	Small compound with fence	Small compound no fence	
Rent	-20% discount	-10% discount	-15% discount	

Section D

This section seeks to collect information on tenants' socio-economic background that may influence residential property choice under negative externality.

19. Sex

(a). Male

(b). Female

20. Marital status

(a). Single

(b). Married

(c). Divorced

(d). Widow.

(e). Widower

21. Are you employed?

(a). Yes

(b). No.

22. Which of the following categories of income groups best describes your income status?

(a) High income group, (Above ₦ 1,500,000, per annum)

(b) Middle income group, (Below ₦ 1,500,000 per annum)

(c) Low income group. (Below ₦220,000 per annum)

23. How many people are responsible for the decision of your current choice of home?

(a) Just me,

(b) Myself and my wife,

(c) Myself, my wife and children.

24. Kindly tick the highest level of educational qualification obtained (by you or any other person involved in your housing choice decision) from the options provided below.

(a) Nil,

(b) Primary School Certificate

(c) Secondary School Certificate

(d) NCE/OND

(e) HND/Bachelors

(f). Postgraduate certificate.

25. Age

(a) 18-25 years

(b) 26-33 years

(c) 34-41 years

(d) 42-49 years

(e) 50-57 years

(f) 58 and above

26. What is your family size in the current rented house?

(a).1-3,

(b).4-6,

(c).7 and above

27. Name of residential area (.....)

Thanks for Participating!

Appendix IX

Acceptance for Publication

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PROPERTY AT UWS
Leaders in Property Education"

Mr Solomon Akinbogun

Heriot Watt University

Solomon

I am pleased to advise that your paper **"The property market maturity framework and its application to a developing country: the case of Nigeria"** has been accepted for publication in the international section of the **Journal of Real Estate Literature**.

It will appear in JREL in Volume 23, Number 1 in the first half of 2015.

Thank you for your contribution to the body of knowledge for African real estate.

Professor Graeme Newell, University of Western Sydney
Editor, International section, Journal of Real Estate Literature

Appendix X

ERES 2014 Conference Paper's Abstract

Modelling Tenants' Choices with a Negative Externality; the Case of Residential Property Market.

By,

AKINBOGUN Solomon Pelumi[1]. Colin Jones[2], Neil Dunse[3]
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United Kingdom.

Abstract.

Residential property is globally recognized as an essential part of human life where dealings between landlords and tenants would continue in perpetuity. It encompasses a bundle of unique characteristics that makes its' rental and choice of renting to substantially differ among prospective tenants. Therefore, the need to ensure that common property resource embedded in residential property is not over-consumed by landlords to create a social cost in form of a negative externality on tenants' welfare. This study examines the impact of negative externality created by the location of graves within residential properties in an unregulated informal residential property market. In the absence of hedonic expression of values on the variable of interest, the study applied stated choice method to collect choice data from respondents. The specific of the research methodology involves the use of choice based conjoint analysis for research design and data collection. The study applies basic Multinomial logit model for parameter estimation at the aggregate level. In order to overcome the shortcomings of this model, parameters were further estimated using Hierachical Bayes model which allows individual estimation of level effect and internal model validation.This model is also employed to determine the average importance of attributes contribution to the respondents' choice and the willingness to pay for residential properties impacted by grave's externality.

Keywords: Choice, negative externality, Willingness to Pay, residential properties.

Appendix XI

Cobra 2012 Conference Paper Abstract

RESIDENTIAL PROPERTIES FOR GRAVES: A TEST OF THE EFFICIENCY OF PLANNING LAW.

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ABSTRACT.

Land is an essential natural resource having numerous competing alternative uses which necessitate definition of potential uses within the ambit of legal framework to enhance compatibility and sustainable development. Basically, the extent of compatibility of land uses on residential real estate in urban areas is a measure of the performance index of the property law and its regulatory structure. Therefore, this paper seeks to uncover the causes of inefficiencies of Nigeria planning laws to prohibit indiscriminate location of graves on residential properties. It explores the Nigerian Urban Regional Planning law with a focus on development control paradigm and its specific ability to prohibit graves on residential properties in Akure. Lastly it examines the effects of the emerging negative externality on property value and sustainable real estate development in the case study. The paper suggests a review of development control laws and re-engineering of its' enforcement strategy with a particular focus on uniform interpretation of planning law on all residential land.

Keywords: grave, land, law, planning, residential property.